

***Sustain the Mission — Secure the Future***



# **Searching for Sustainability**

## **in an Encroaching and Transforming Environment**

**23 August 2004**

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## Report Documentation Page

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# Sustainability Defined

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- the ability of a society, ecosystem, or other ongoing **system** to continue **functioning** into the indefinite future without being forced into decline through the exhaustion or overloading of the key **resources** on which that system depends
  - Robert Gilman (1992); American Institute of Architects (1996)
- the ability of a system to continue activity over a desired time
  - Change Reengineering (1999-2000)
- capacity for continuance into the long term future
  - The SIGMA Project 2003



# Sustainability Aspects

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- Resources
  - Extraction, production, consumption
- Waste
  - Generation, disposition
- Ecosystems
  - Manipulation, displacement, disruption
- Humans / Communities
  - Well-being (physical, mental, social, financial)



# Nature's Unique Contribution

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- It provides resources...
- It performs ecological services...
- It absorbs wastes...

## Nature's "Rules"

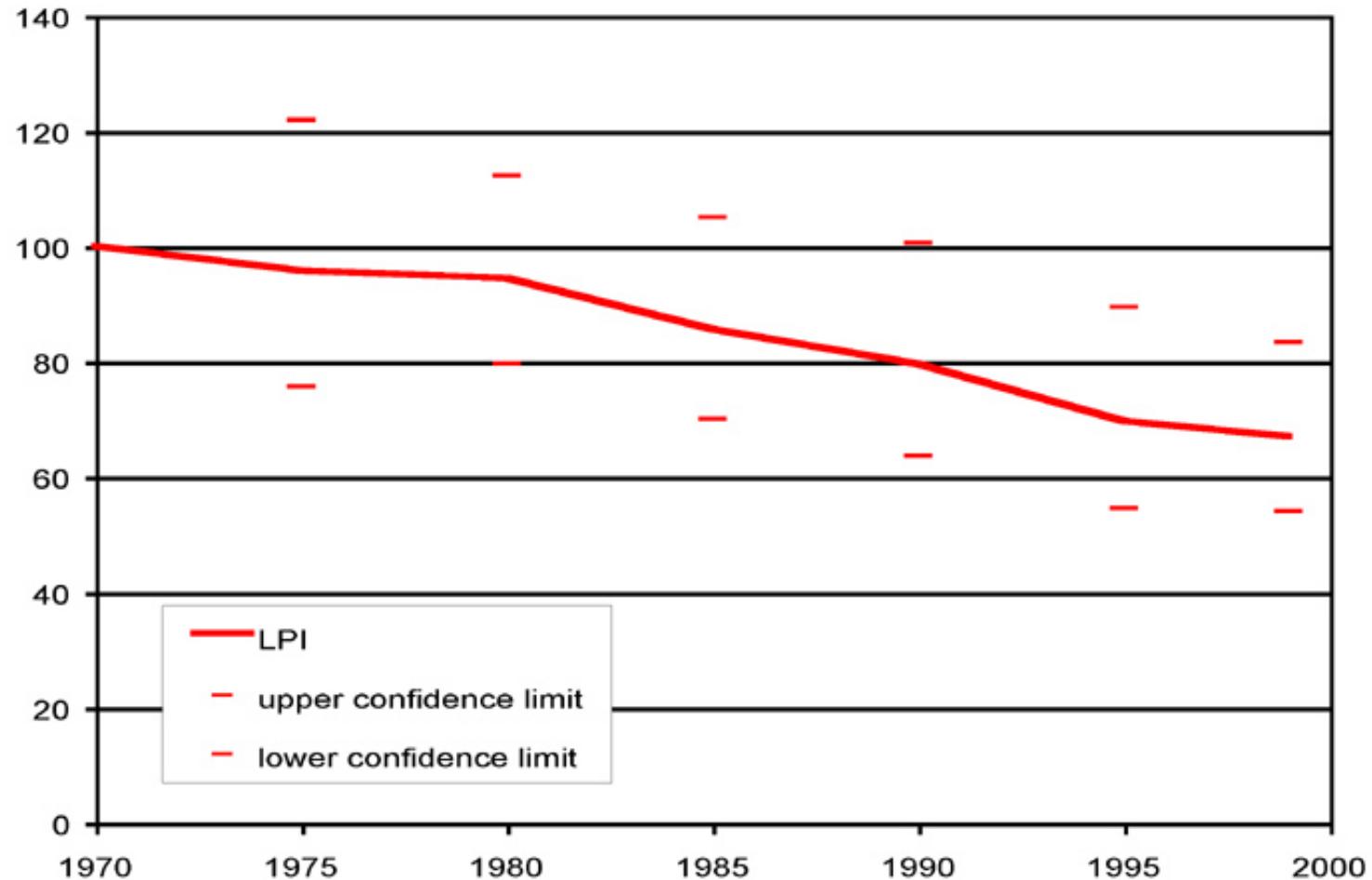
- Don't use up all the resources
- Don't disrupt ecological services – life support
- Don't overwhelm waste-absorption capacity



# Living Planet Index



## Years 1970 - 2000



Source: Living Planet Report (2000)



# Ecosystem Indices

Fig. 1:  
**LIVING PLANET INDEX,**  
1970–99

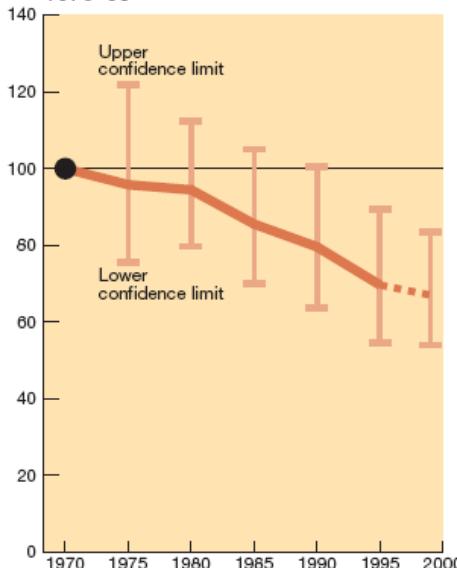


Fig. 3:  
**GLOBAL FOREST ECOSYSTEMS INDEX, 1970–99**

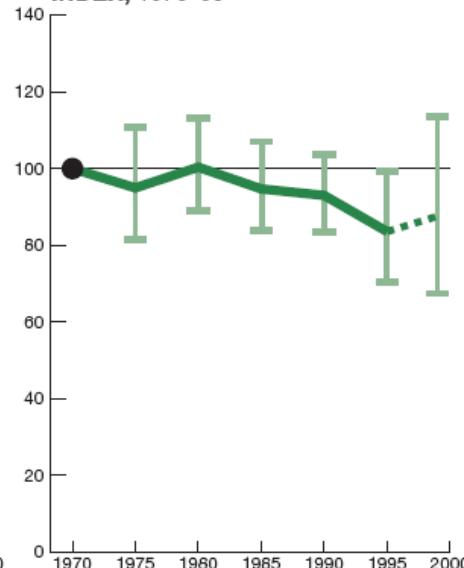


Fig. 4:  
**FRESHWATER SPECIES POPULATION INDEX, 1970–99**

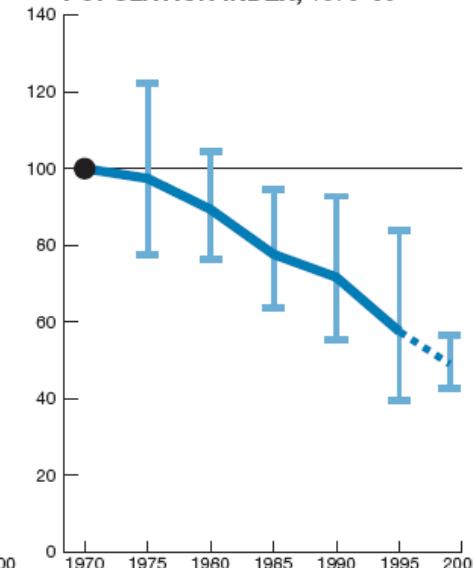
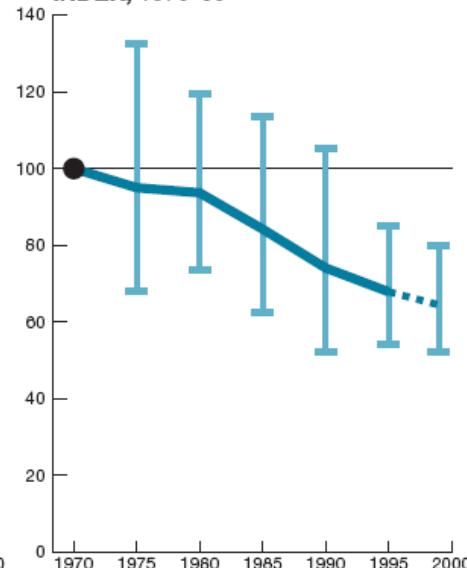


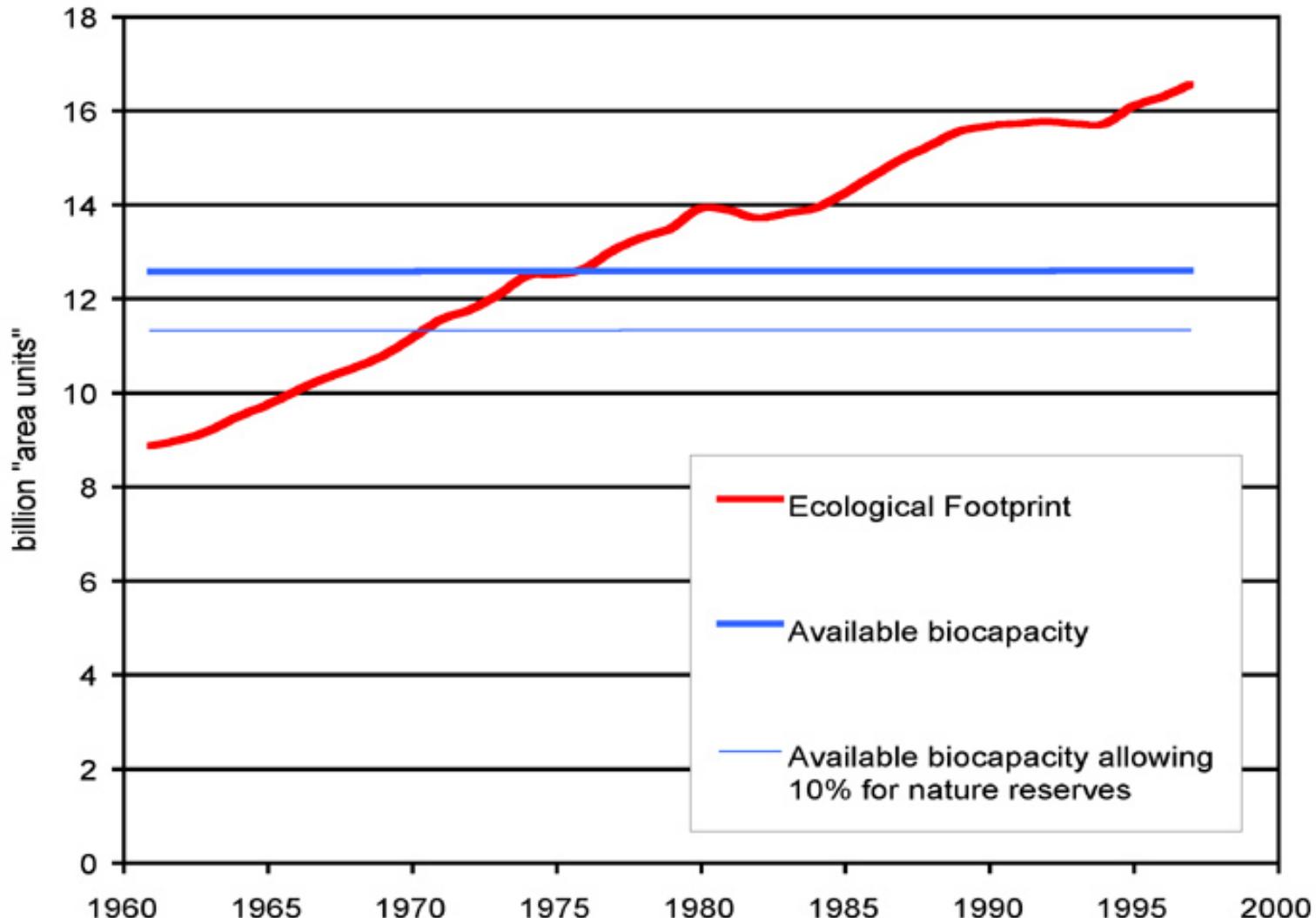
Fig. 5:  
**MARINE SPECIES POPULATION INDEX, 1970–99**



Source: Living Planet Report (2000)

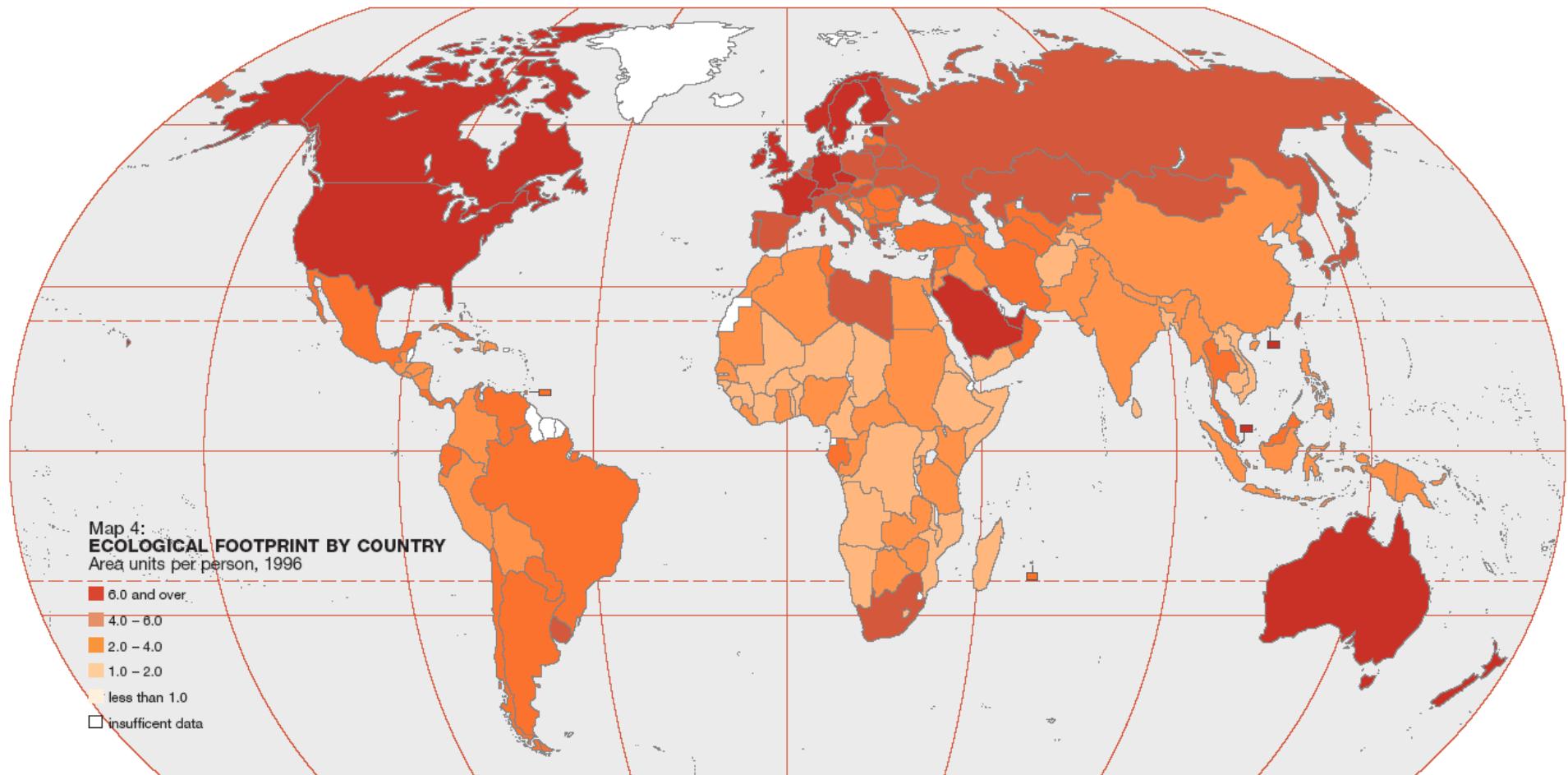


# Ecological Footprint



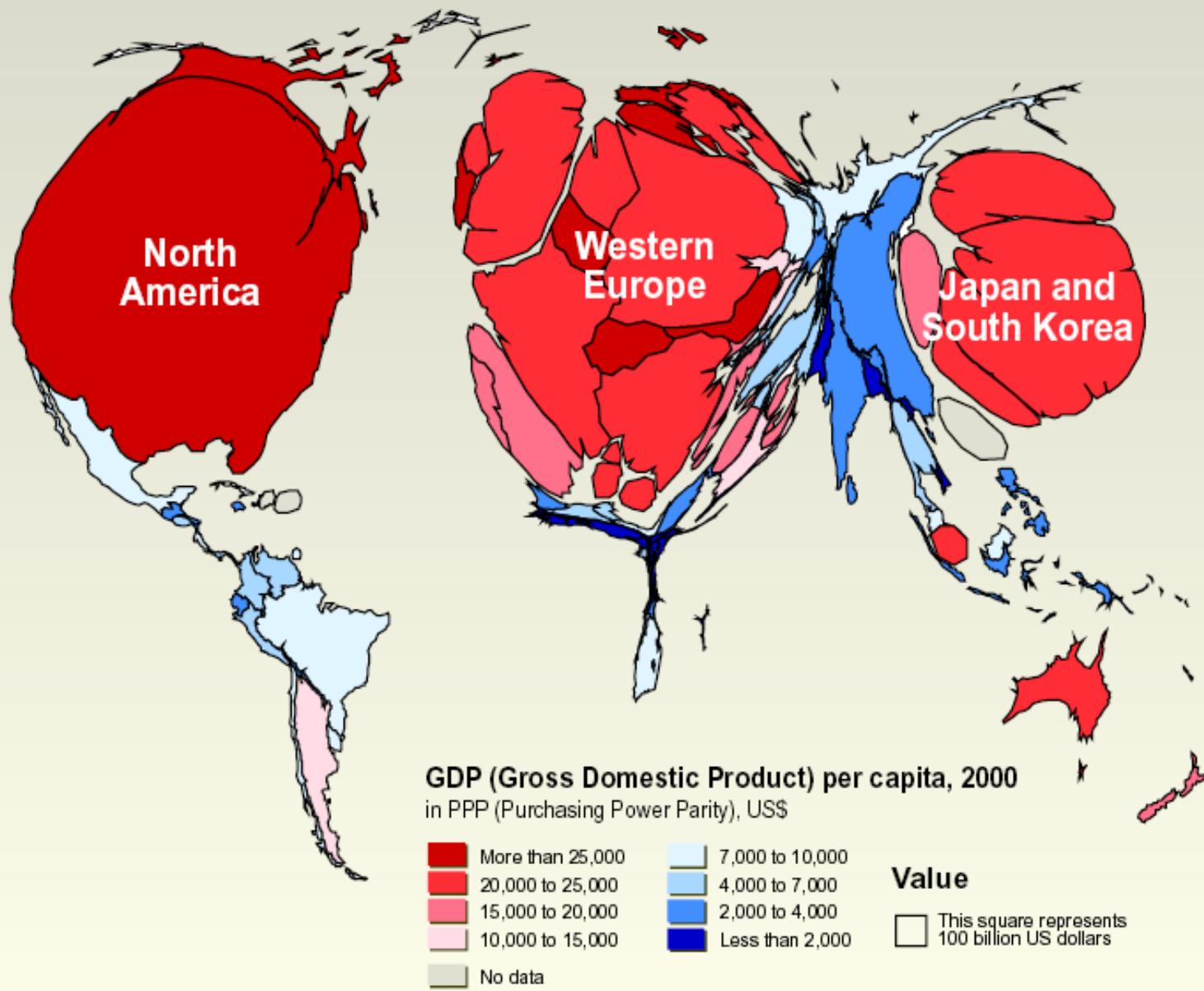


# Ecological Footprints of Nations



Source: Living Planet Report (2000)

# AN ALTERNATIVE VIEW OF THE WORLD





# What “Business” Are We In?

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We’re in the security business!

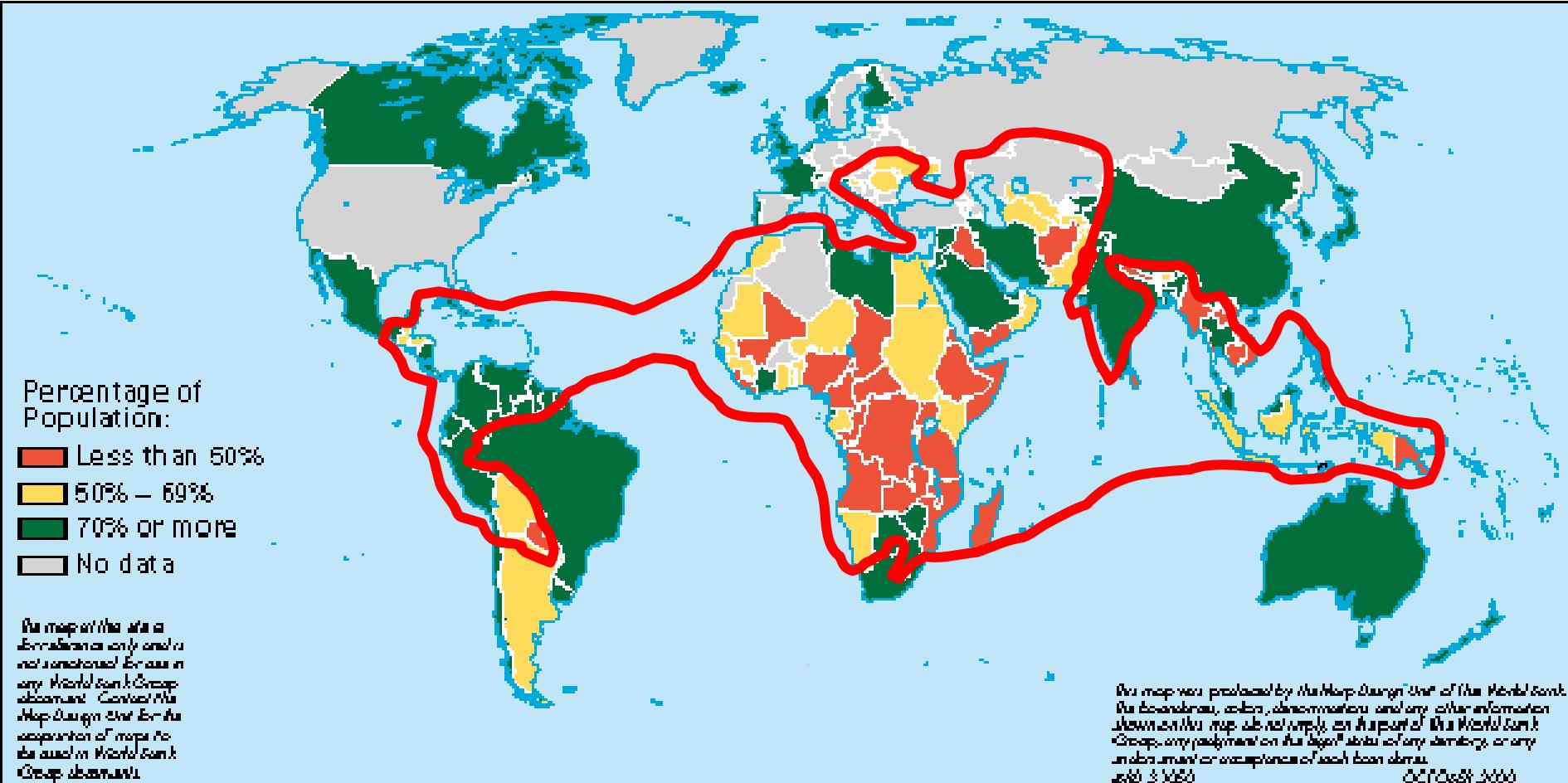
- Security:
  - “freedom from doubt, anxiety or fear”
  - “freedom from fear of *privation* or attack”
- Privation:
  - “lack of *basic necessities* or comforts of life”

Sustainability and security are both about protecting long-term national interests





# Access to Safe Water, 1990-96



Percentage of Population:

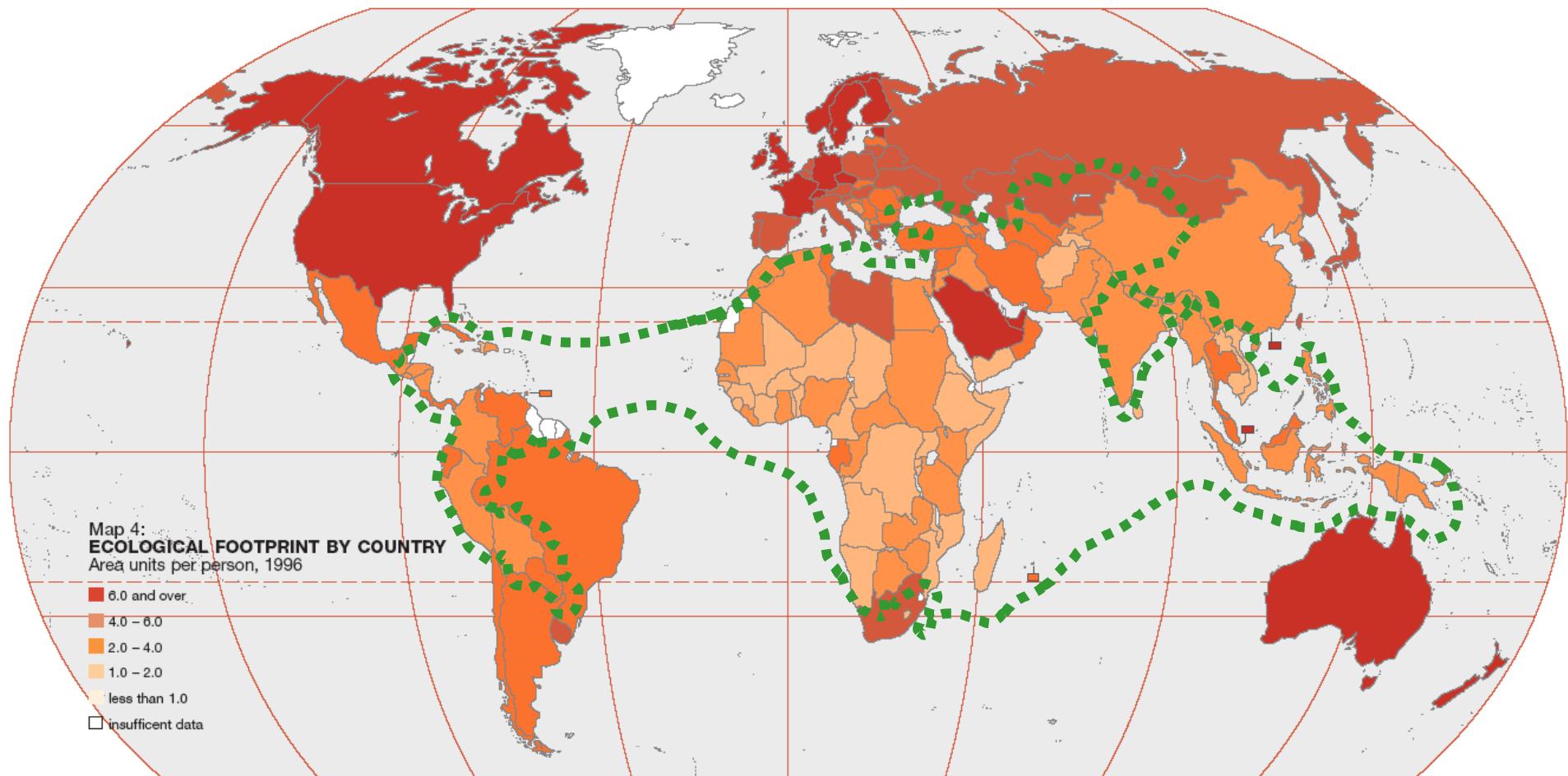
- Less than 50%
- 50% – 69%
- 70% or more
- No data

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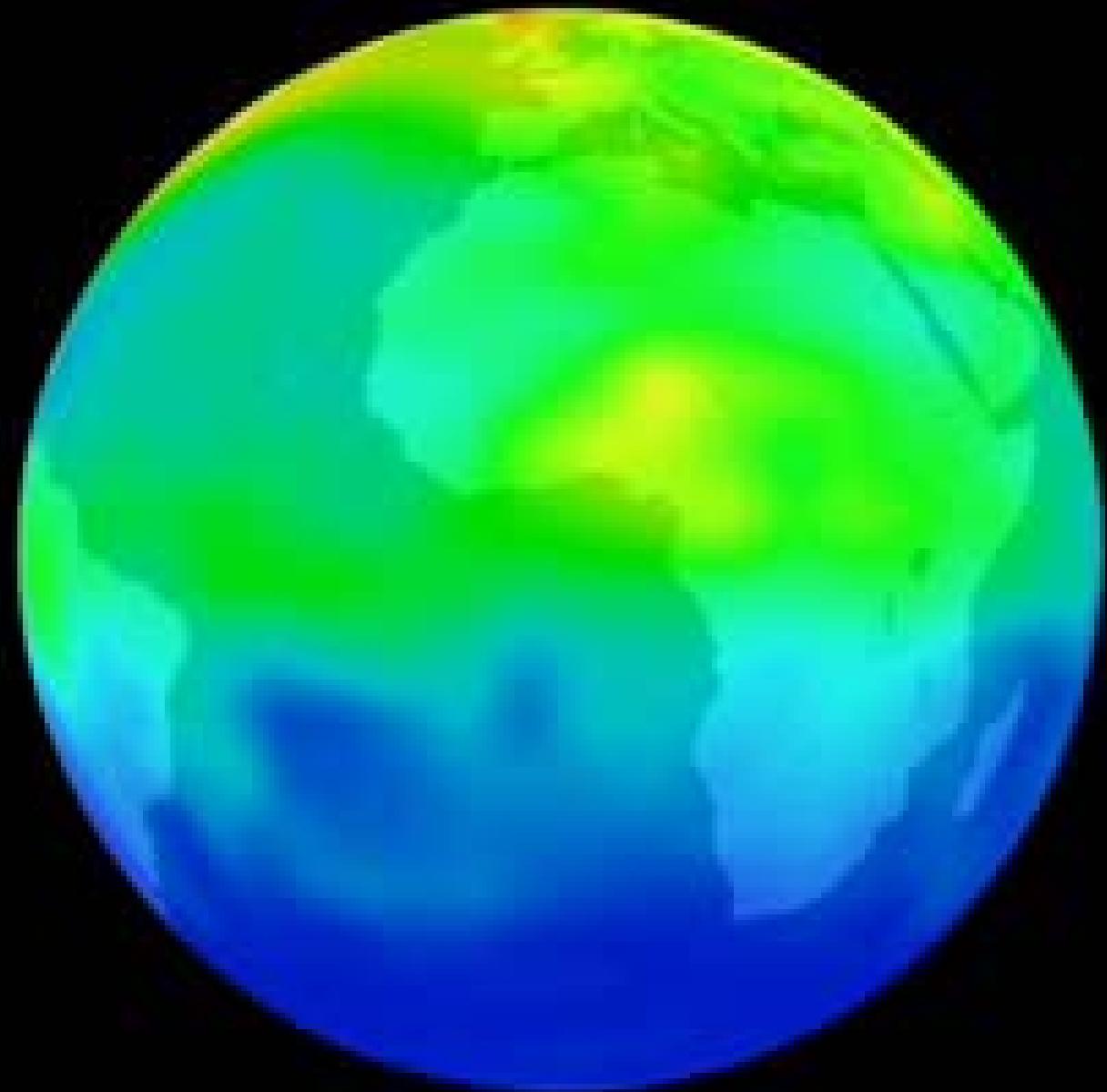
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# Ecological Footprints of Nations



Source: Living Planet Report (2000)



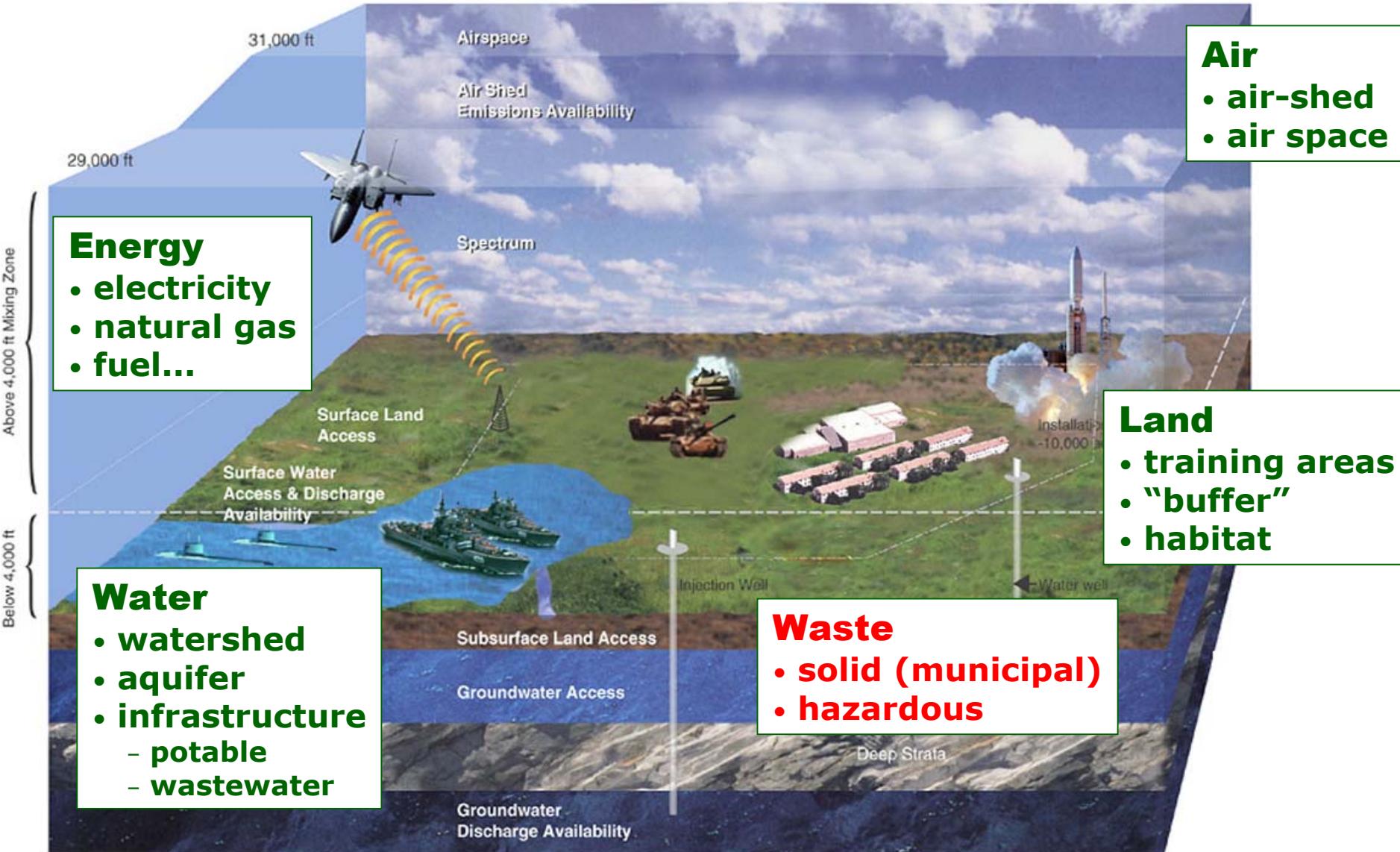


***“We’re at ‘zero balance’ on earths  
— we’ve only got one, no spares.”***

**MG Lust**

*U.S. Army, Assistant Chief of Staff for Installation Management*

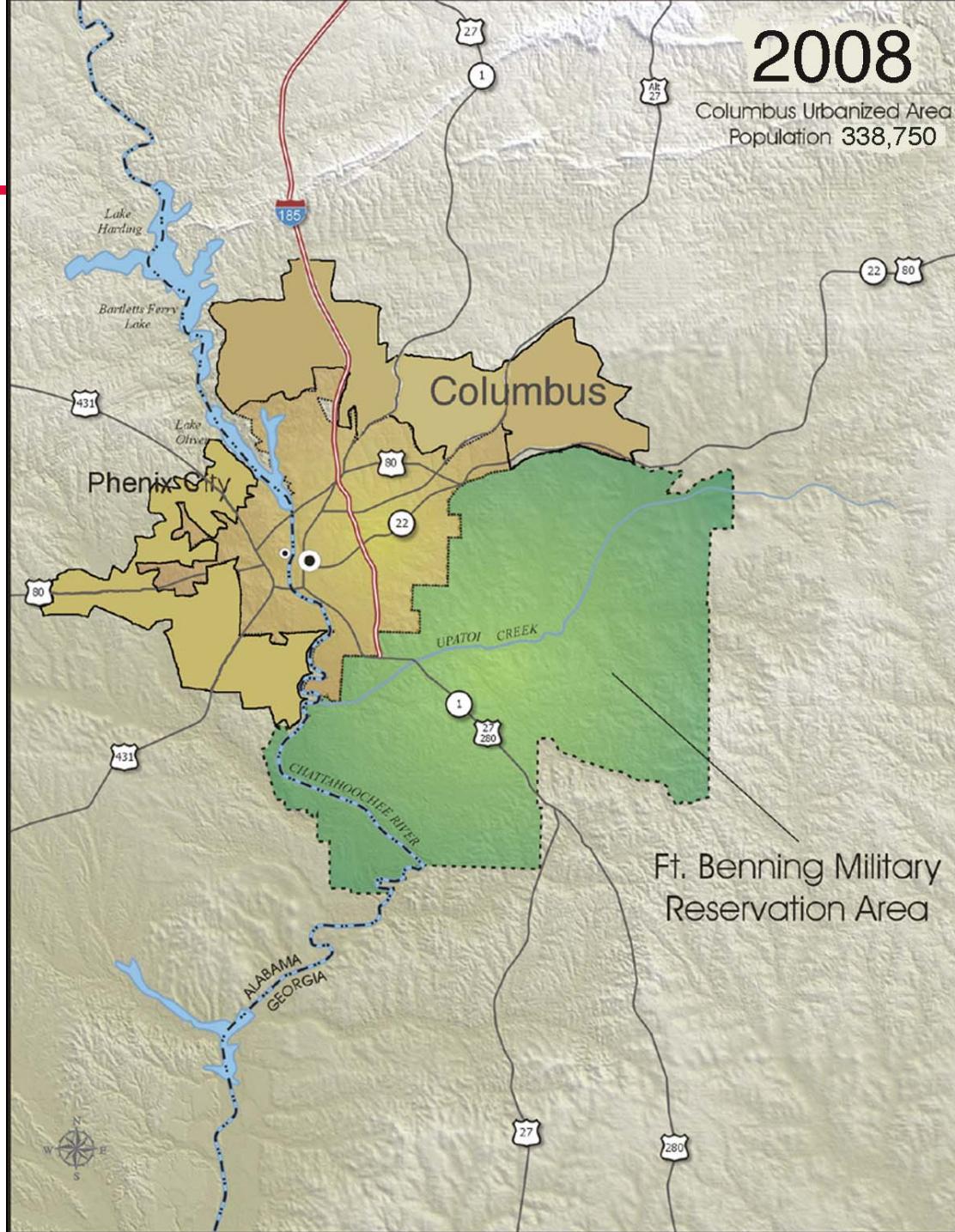
# Resources We Need





# 2008

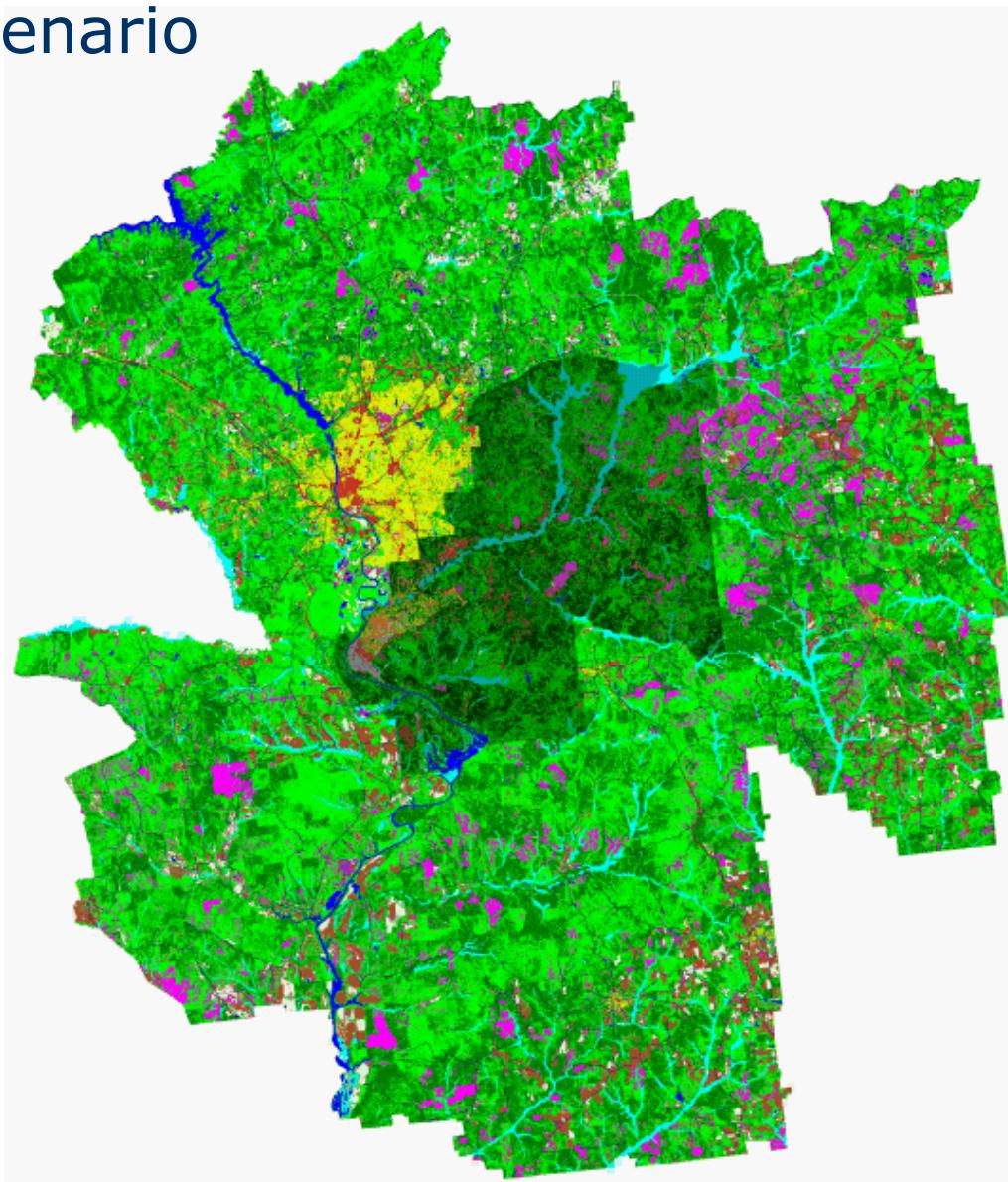
Columbus Urbanized Area  
Population 338,750





# Regional Urbanization

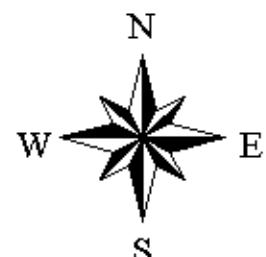
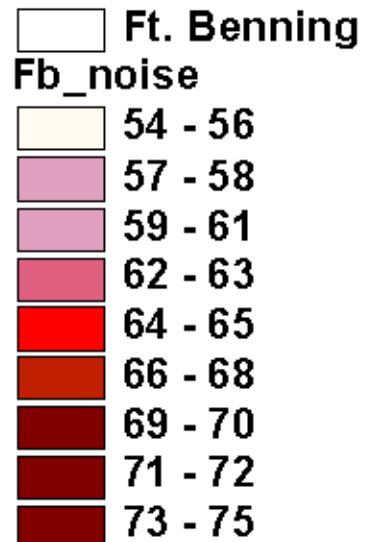
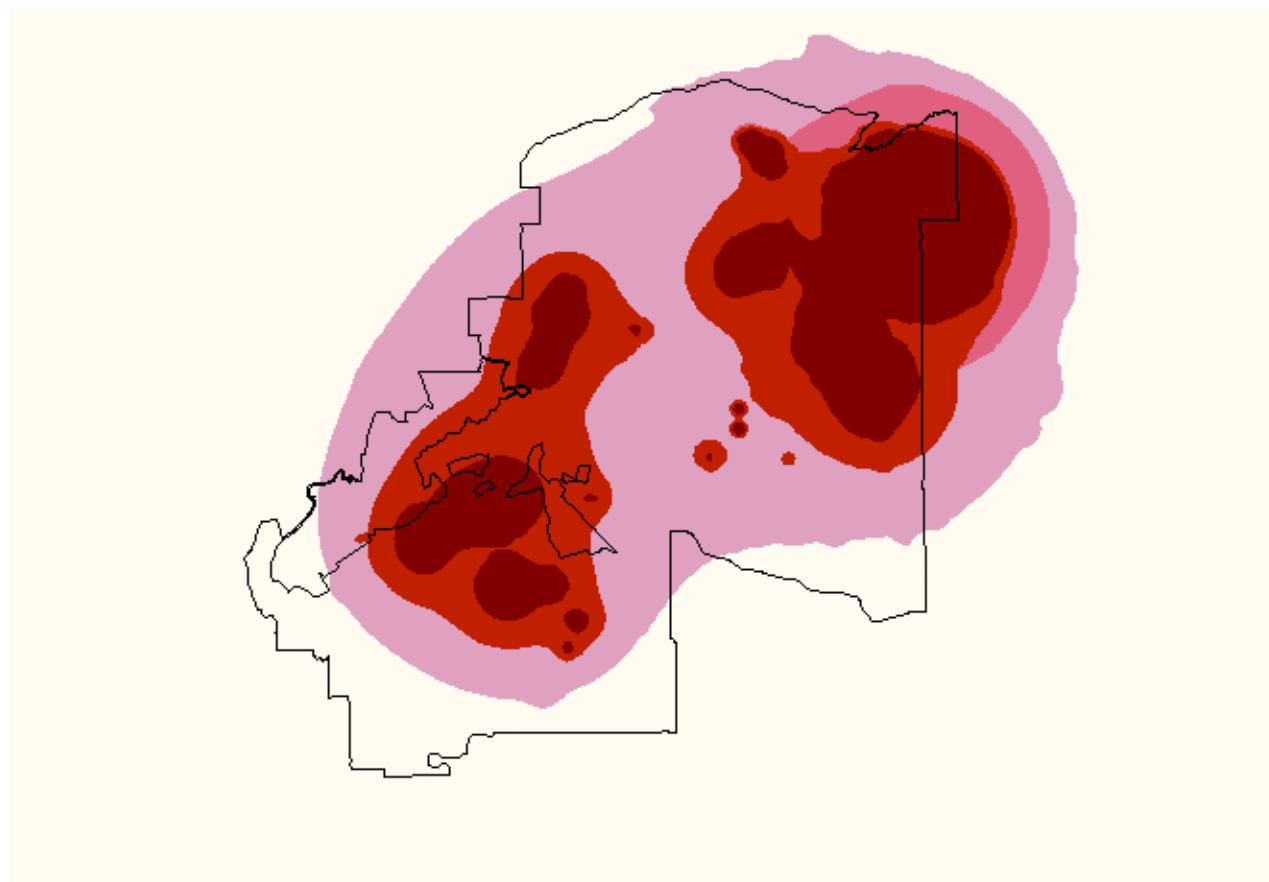
Land use change scenario  
Years 2000 - 2040



Fort Benning, GA



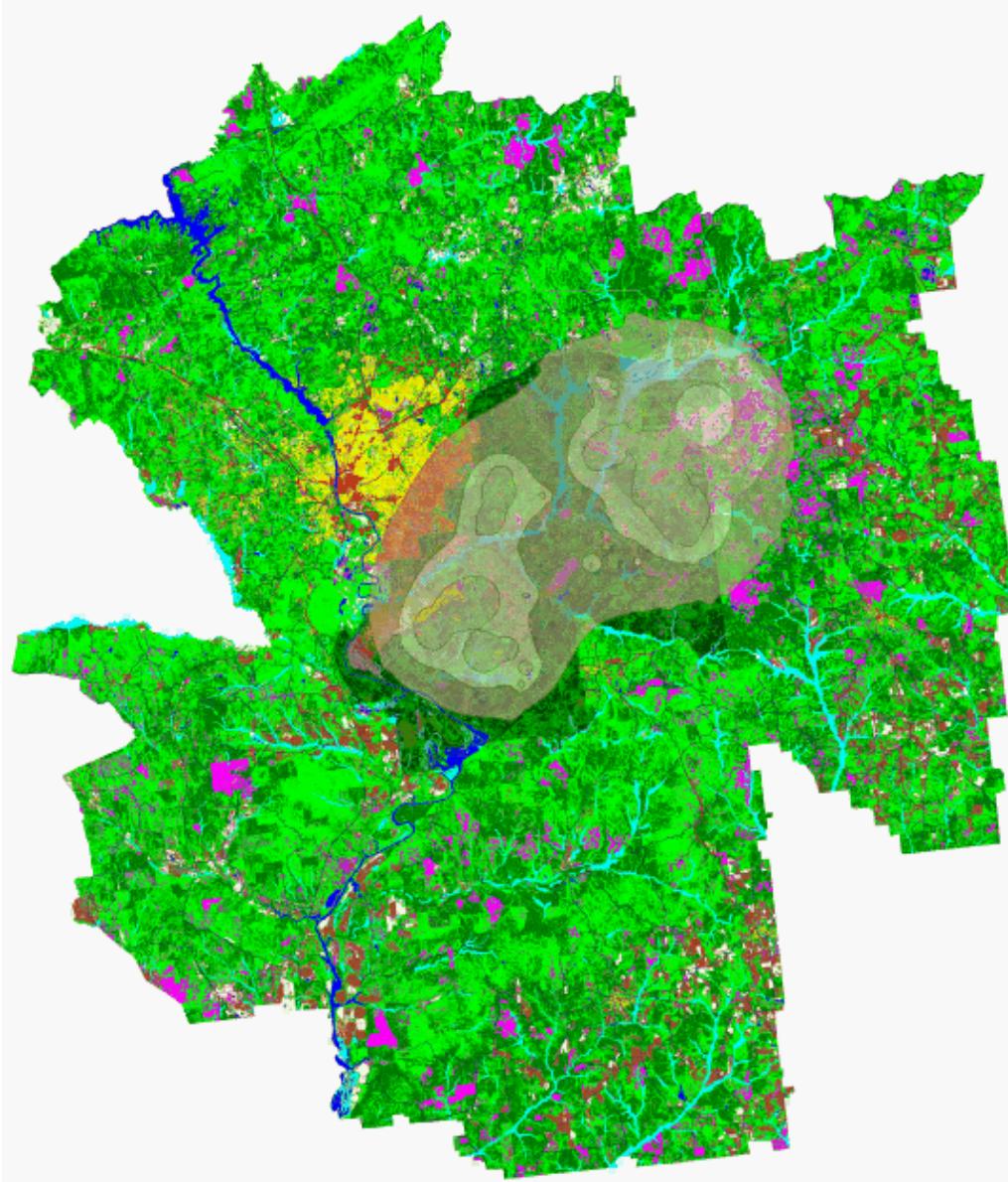
# Mission “Externalities” - Noise





# Noise + Urbanization = Conflict

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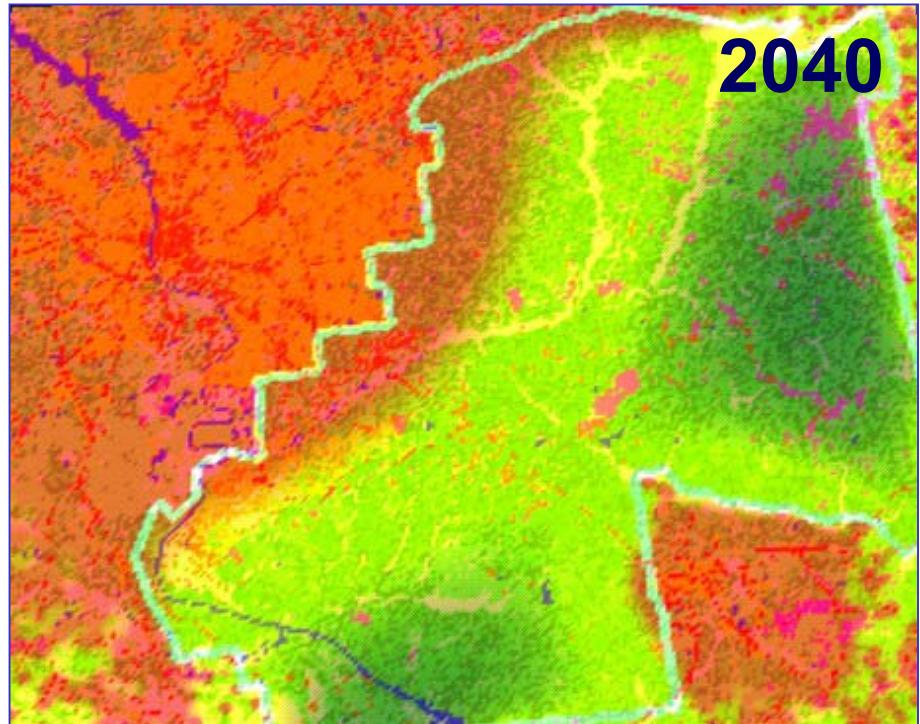
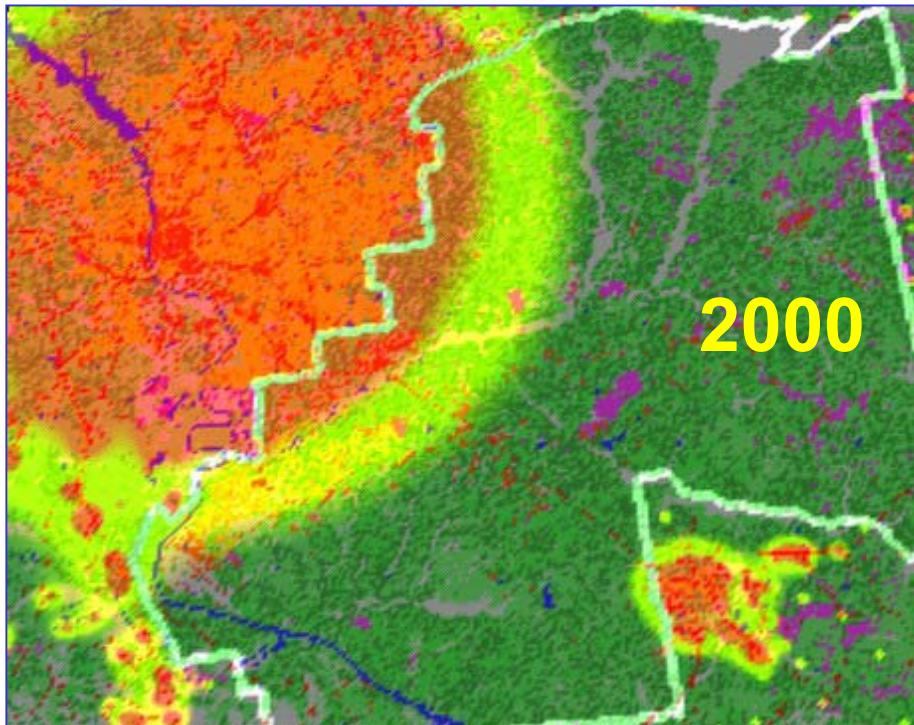


# Long-Term Mission Impacts



Ft Benning, GA

Population density scenario  
Years 2000 - 2040



Result = possible loss  
of future training  
opportunities due to  
noise related conflicts

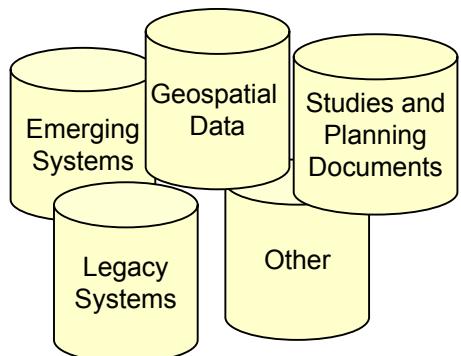


# Resource Capability Model\*

Determine Operational Requirements

Determine Corresponding Resource Requirements

Determine Resource Availability



Compare resource requirements against resource availability for each resource category using metrics

Resource Categories:

- Airspace
- Air Shed Emissions Availability
- Surface Land Access
- Surface Water Access (Supply)
- Water Discharge Availability
- Spectrum

Resource Readiness Ratings per metric\*

RO3 – Major opportunities

RO2 – Significant opportunities

RO1 – Some opportunities

RR – Adequate (Minor opportunities or deficiencies)

RD1 – Some deficiencies

RD2 – Significant deficiencies

RD3 – Major deficiencies

\* RO = Resource Opportunity

\* RD = Resource Deficiency

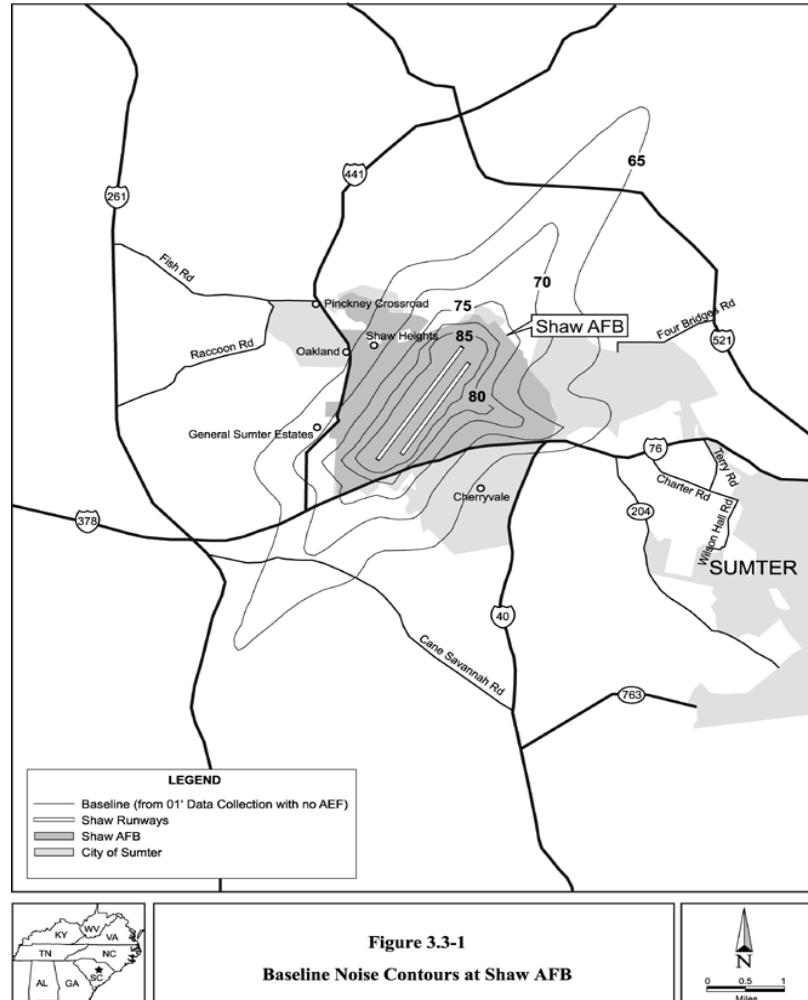
\* Developed by Booz-Allen Hamilton



# Ex: Surface Land Resource Adequacy for Off-Site Compatible Acres



- Resource *Requirements* defined by acres within 65+ dB contours
  - Total acres = 9,600
  - Off-base acres = 6,300
  - On-base acres = 3,300
- Resource *Availability* defined by “compatible acres”
  - 5,355 - 5,600 compatible acres
  - 700 - 945 incompatible acres using FAA guidelines (>65 dB DNL)
  - 85 - 89% compatible acres off-base
- Bottom line: Resource “demand” is greater than “supply”





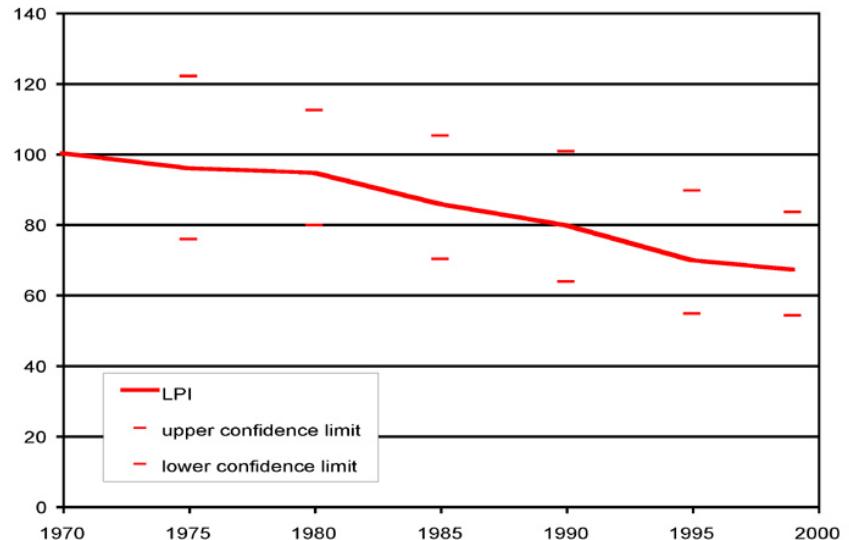
# Sustainability Factors



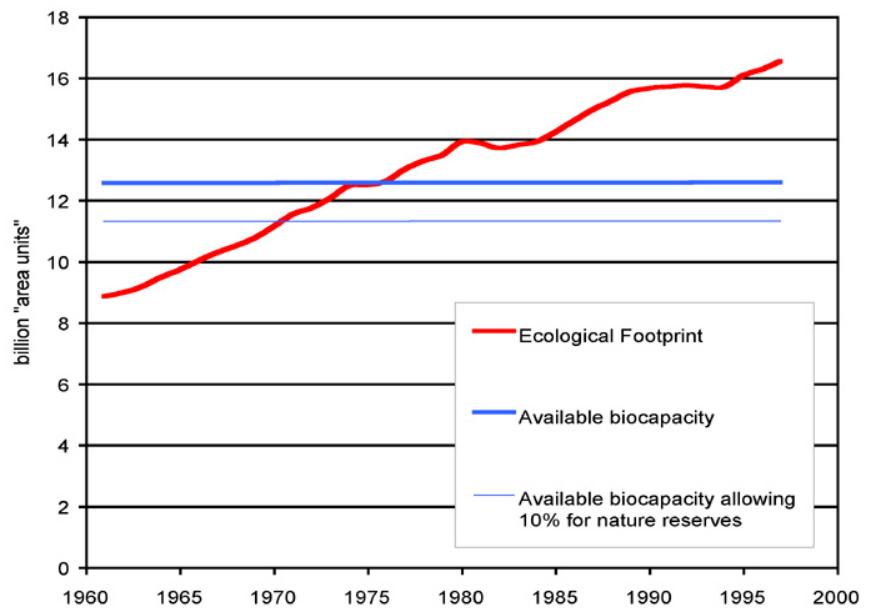


# Supply vs. Demand

## Living Planet Index



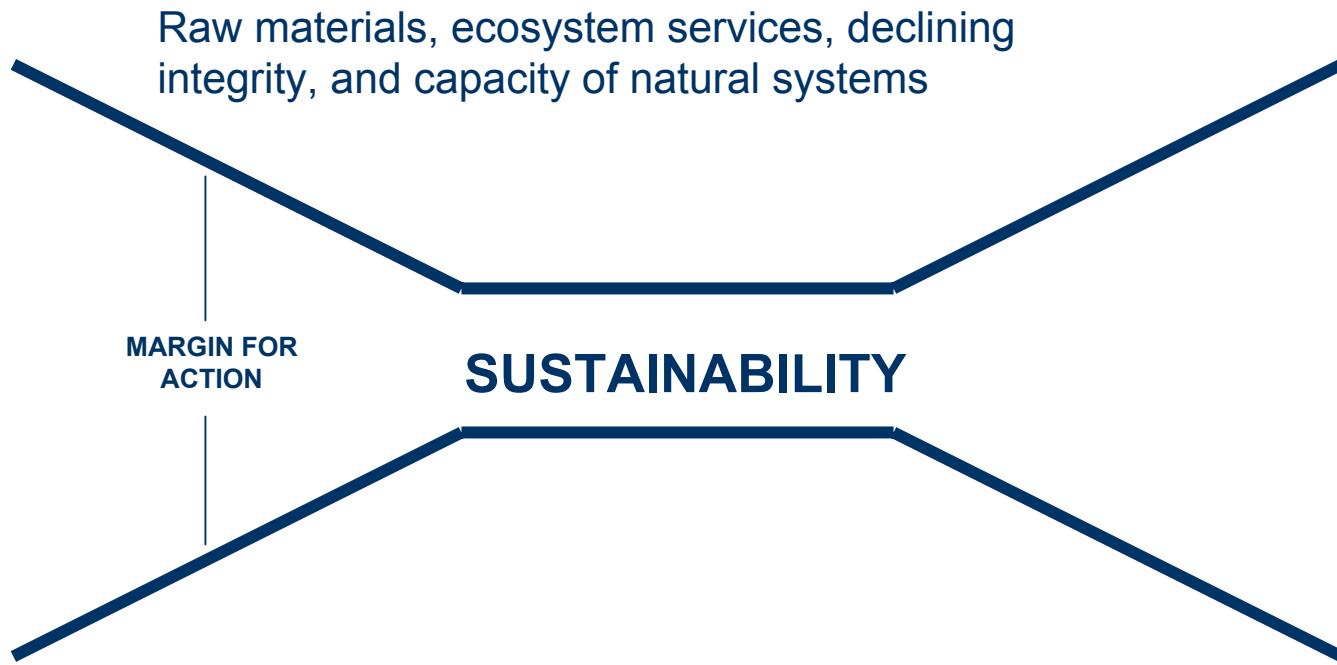
## Ecological Footprint





# Resource Funnel

## Resource Availability and Ecosystem Ability to Provide Vital Services



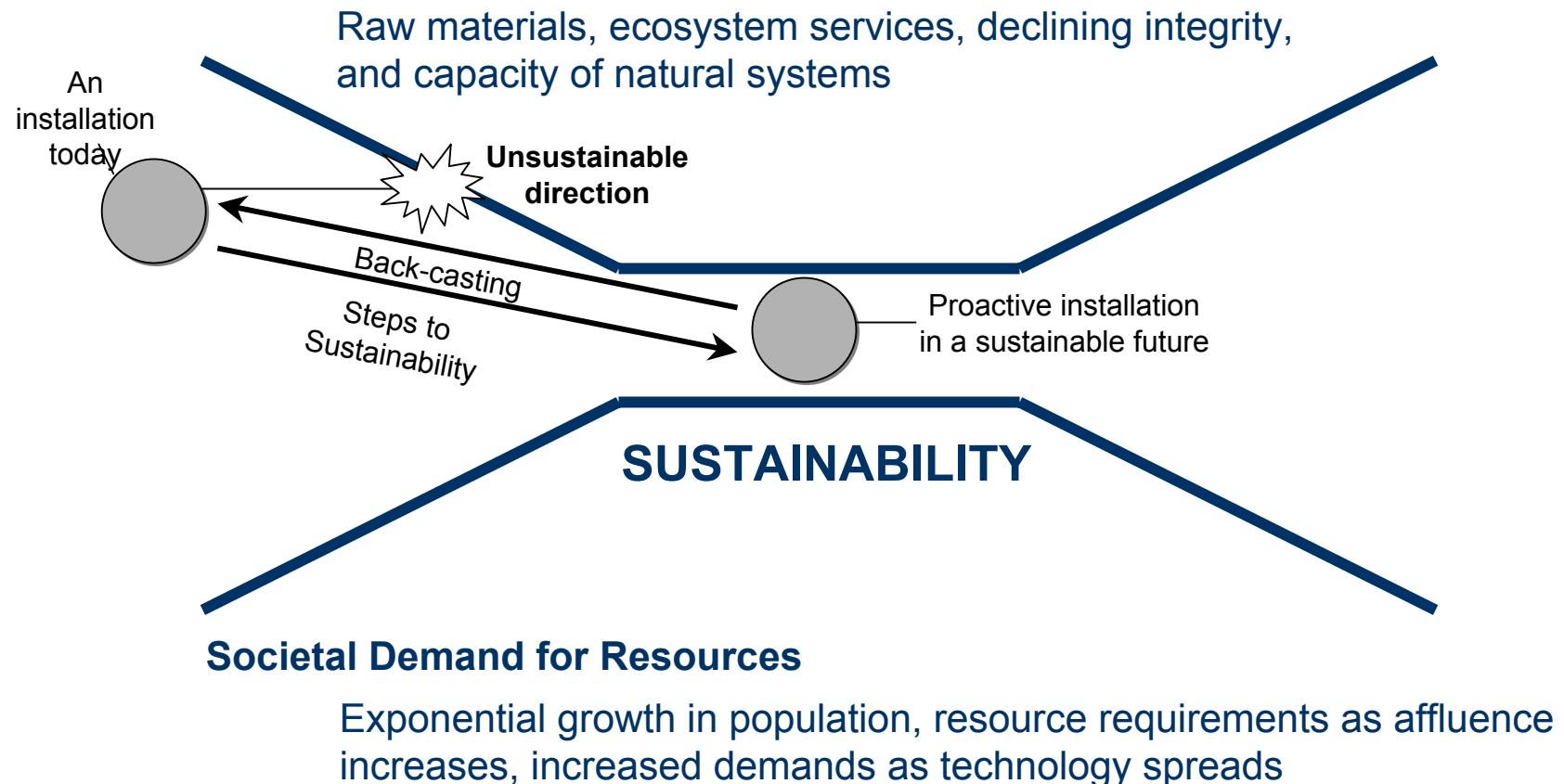
Exponential growth in population, resource requirements as affluence increases, increased demands as technology spreads



# “Back-casting” and Strategic Planning



## Resource Availability and Ecosystem Ability to Provide Vital Services





# Sustainability Integration

## “Targets of Opportunity”

- Stationing
  - Capacity Analysis
  - Cost Analysis
  - Impact Analysis
- Planning
  - Strategic planning
  - Regional planning
  - Master planning
- Management
  - ISO 14001 EMS
  - ISO 14031 EPE
  - Balanced Scorecard
- Costing
  - Systems acquisition
  - Stationing actions
  - Facilities / infrastructure
  - Base operations



# Sustainability Applications

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- Installation Management / BASOPS
  - *viability* (long-term) of mission support capabilities
  - carrying *capacity*, encroachment and *elasticity*
  - *adaptability* in response to change
  - quality of life—community and individual *well-being*
- Weapon Systems and Military Operations
  - total ownership *costs*—“cradle-to-cradle”
  - lifecycle “environmental” (to include energy) *impacts*
  - logistical *footprint* and “tooth-to-tail” ratio
  - operational *signature* and *stealth*—enhanced capability



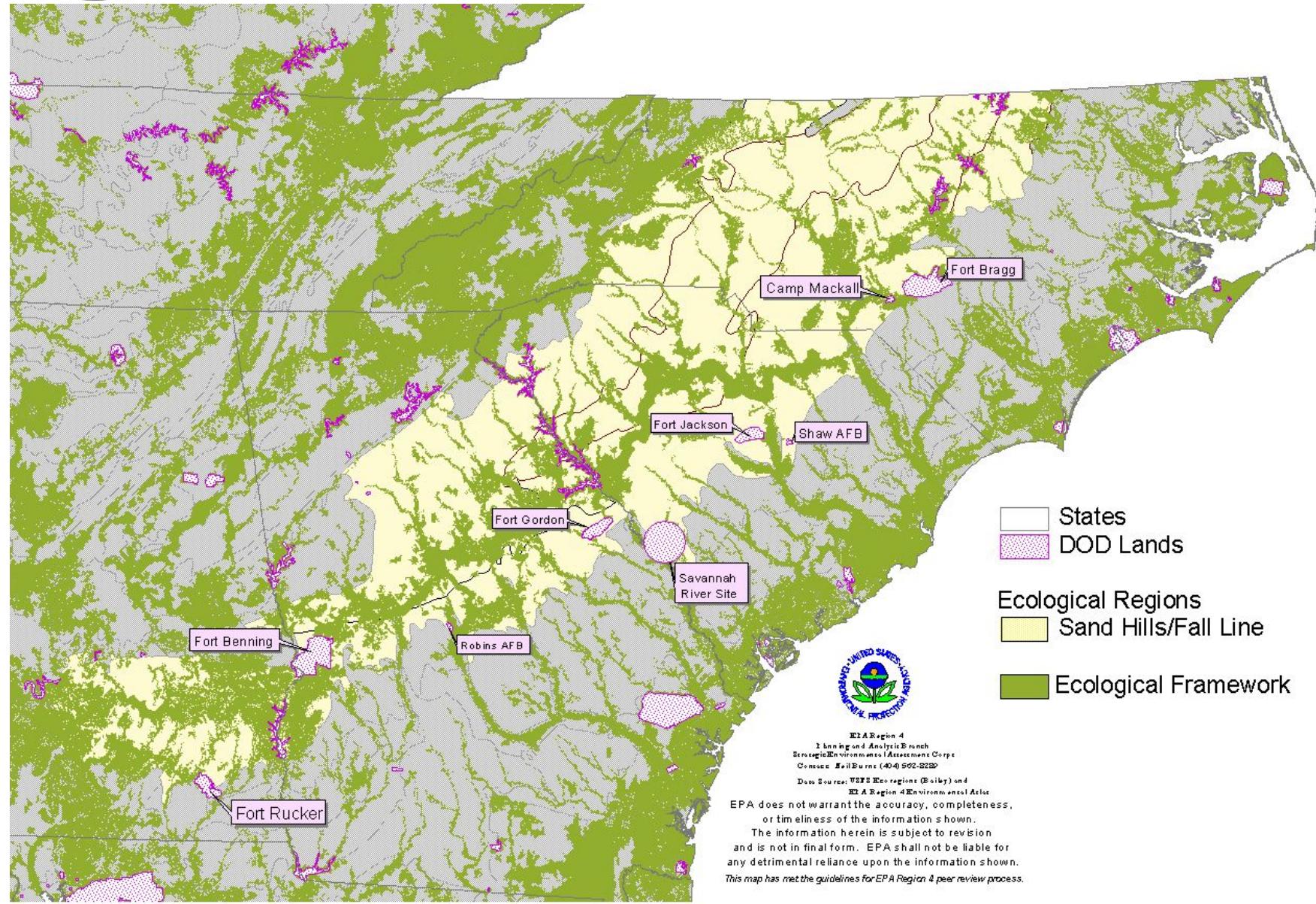
# “Business Case”

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- Increasing **cost** of doing “business”—  
i.e. executing the mission
  - Relationship between *supply* and *demand*
- Maintaining **capability** to meet current and future mission requirements
  - “Ready and relevant, today and tomorrow”



# Strategic Partnerships?





# Closing Thought

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Sustainability is not a question of whether the earth can sustain itself—it can and will.

It is a question as to the extent to which the earth can sustain us—and for how long!



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## Contact info:

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**de@marstel-day.com**



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# Back Up Slides



# Closing Quote

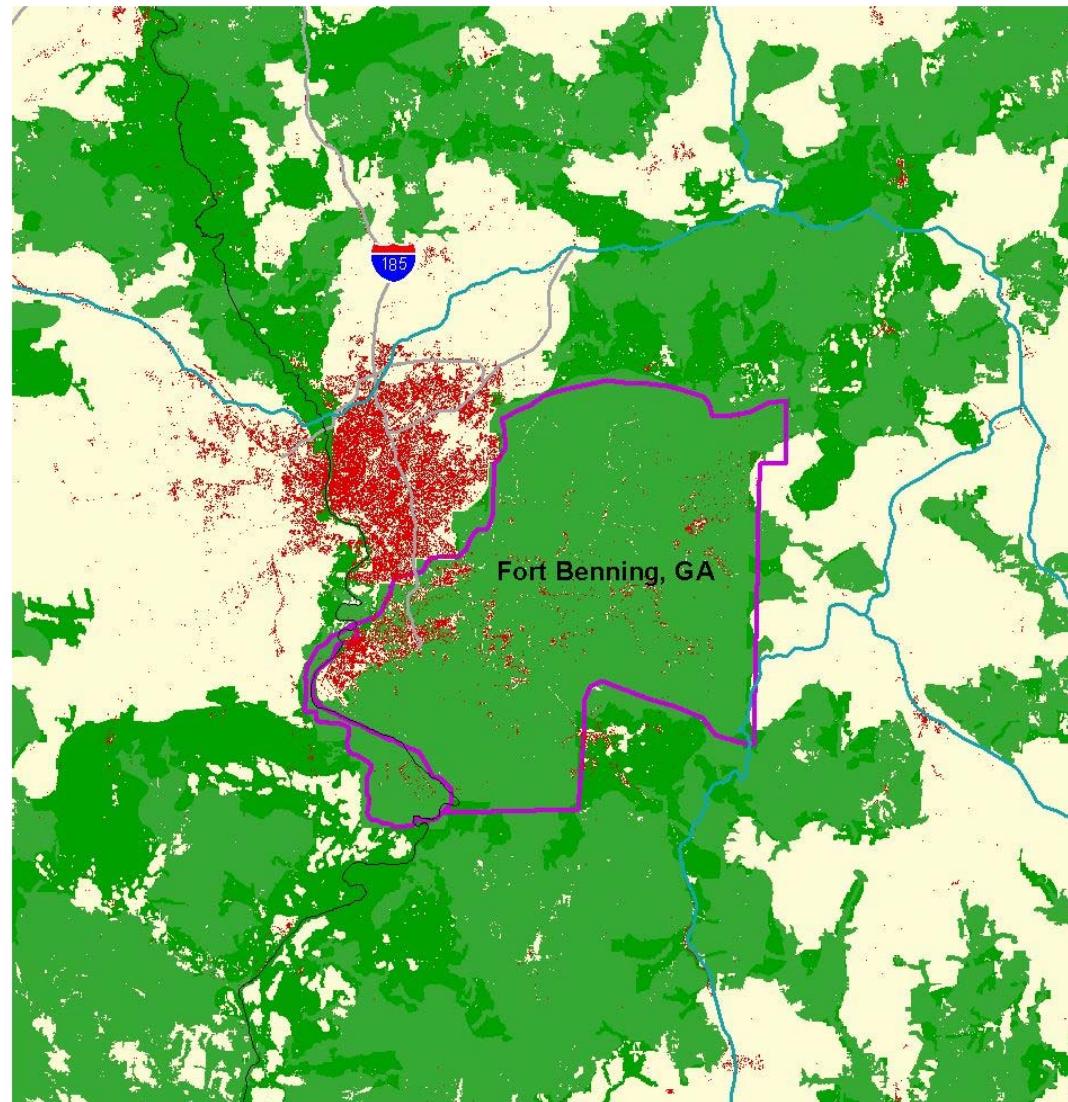
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“...Sustainability moves us beyond simply solving today’s problems. A sustainable Army is one that wins today’s battles while laying the foundation for our future success. It connects today to tomorrow with sound business and environmental practices... Sustainability enables today’s Army to empower the Future Force.”

Assistant Secretary of the Army  
(Installations & Environment)  
September 2003



# Fort Benning and the Southeastern Ecological Framework



□ 8-digit HUCs (watersheds)

□ Ft. Benning

■ Ecological Framework

■ Urbanized Land

# 1990





# Definitions

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## Sustain:

- To maintain; to keep alive; to support; to subsist; to nourish
- Lengthen or extend in duration or space
- Provide with nourishment
- Supply with necessities and support

## Ability:

- The quality of being able to perform; a quality that permits or facilitates achievement or accomplishment
- Possession of the qualities... required to do something or to get something done
- The quality or state of being able; power to perform, whether physical, moral, intellectual, conventional, or legal; capacity

## Capacity:

- Ability to perform or produce
- The amount that can be contained



# Definitions

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## Resilience:

- the amount of disturbance a system can absorb and still remain within the same state
- the ability of an ecosystem to undergo change while still maintaining its basic elements or relationships
- the power or ability to recover quickly—elasticity

## Elasticity:

- The condition or property of being elastic; flexibility
- The inherent property in bodies by which they recover... after the removal of external pressure or altering force
- springiness; resilience; tendency to rebound
- A measure of responsiveness

## Adaptive:

- Suited, given, or tending, to adaptation; characterized by adaptation; capable of adapting
- Having a capacity for adaptation



# Sustainability Strategies

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- Dematerialization
  - Use less (reduce consumption)
  - Waste less (be more efficient)
- Substitution (Trans-materialization)
  - Replace “bad” with “good”
  - Eliminate the need for the “bad”



# Sustainability Aspects

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## From a *Military* Perspective

- Mission
- Community / Society
- Cost / Economics
- Environment



# “Significance”

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- Operationally
- Socially / Politically
- Financially / Economically
- Environmentally



# US Army

## Strategy for the Environment



- Sustain resources to support training, testing and other mission requirements
- Reduce lifecycle environmental impacts and total ownership costs of systems, materiel, facilities and operations
- Enhance operational capability and reduce environmental (and logistical) footprints
- Promote well-being and quality of life for soldiers, civilians, dependents and neighbors

More than 13 million children in America are struggling to survive.

# Won't You Help Feed Them?

By David Oliver Relin

*It's a quiet catastrophe that's rarely reported, yet child hunger is a problem we can solve together. PARADE Contributing Editor David Oliver Relin spent months traveling across the country, visiting families in the neediest communities. Here's what he saw.*

**N**IN THE RIO GRANDE VALLEY, ONLY

to use half of her last loaf of white bread. The

Compean family, from the northwestern corner



Dulce Compean, 23, and her sons—Ibrayn, 2, Edgar, 6, Ismael Jr., 4, and Eduardo, 7—are among thousands struggling to survive in the Rio Grande Valley.

term for those who must survive on a diet not nutritious enough to keep a child healthy. More than 13 million of those

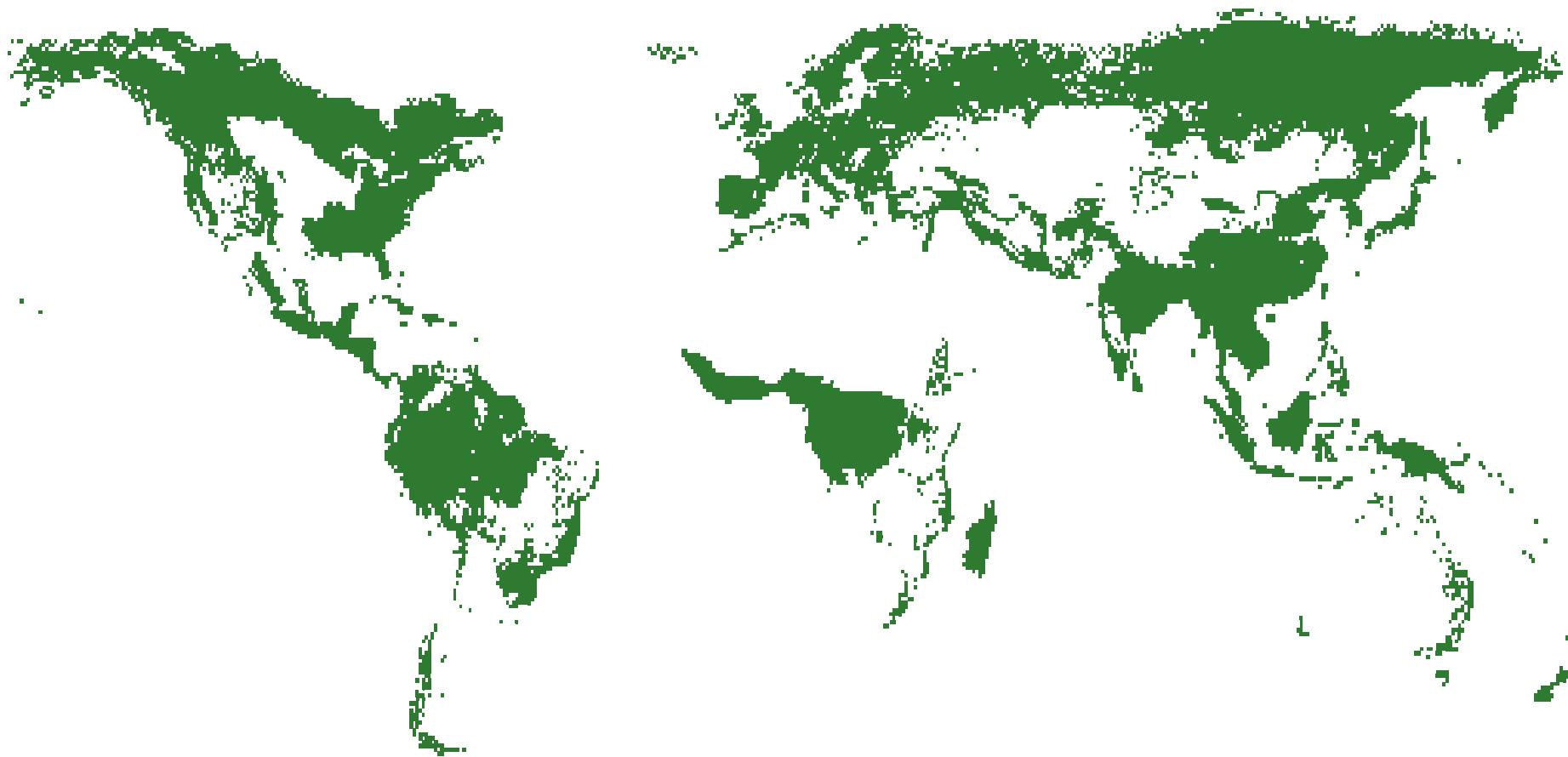
people were children. The U.S. Conference of

Mayors expects that requests for emergency



# Frontier Forests

8,000 Years Ago





# Frontier Forests

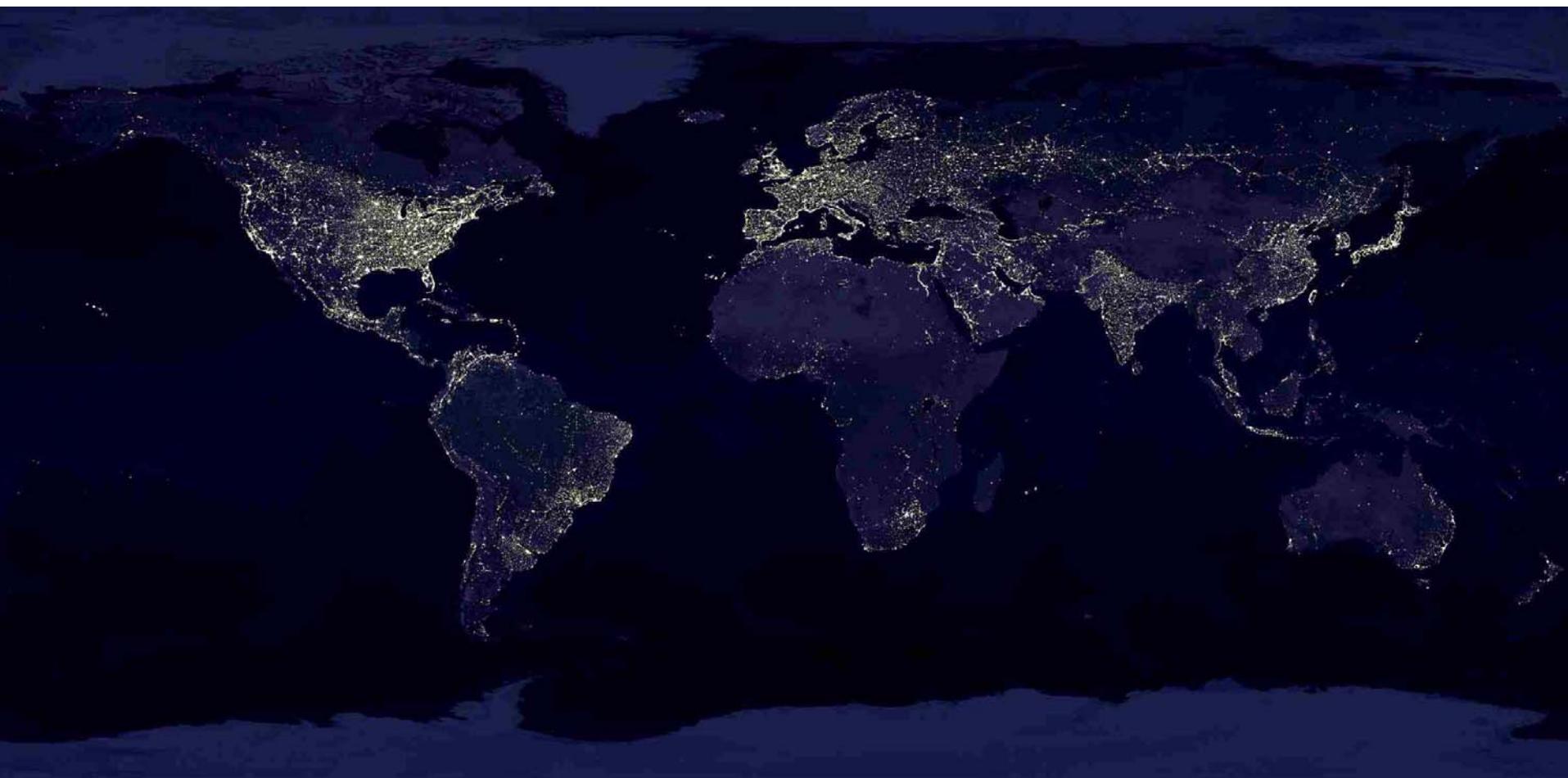
## Today



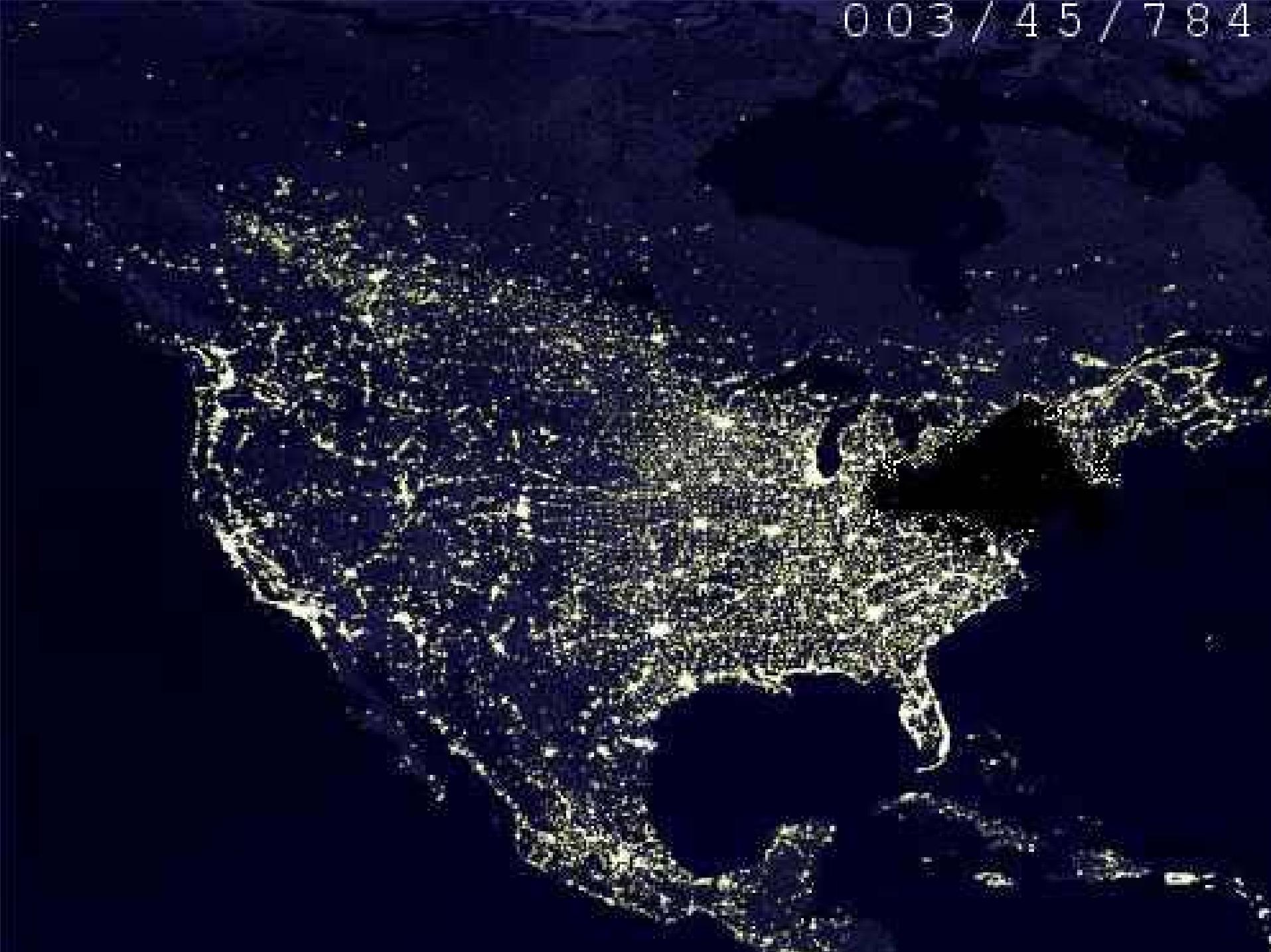


# Earth Lights

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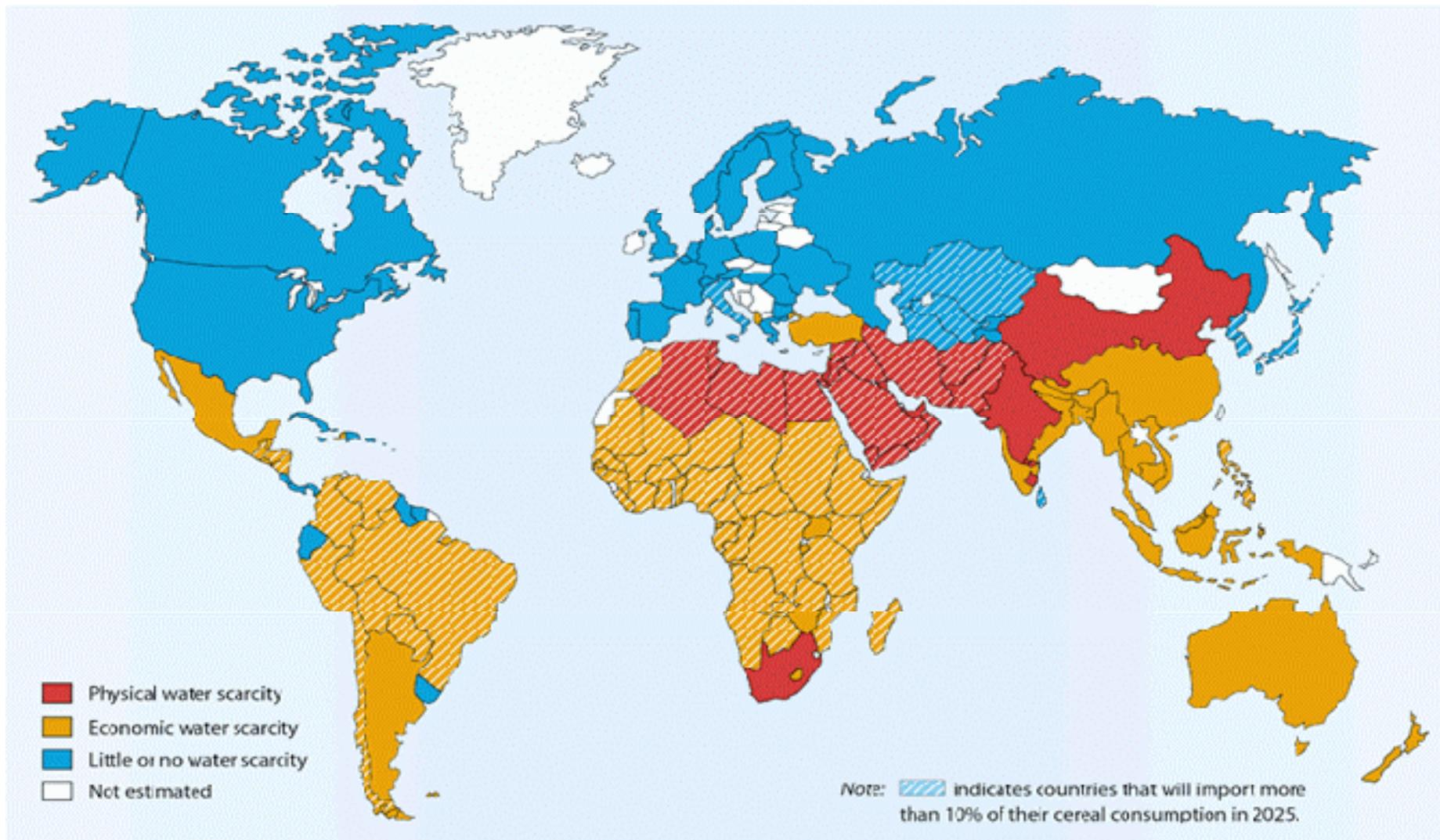








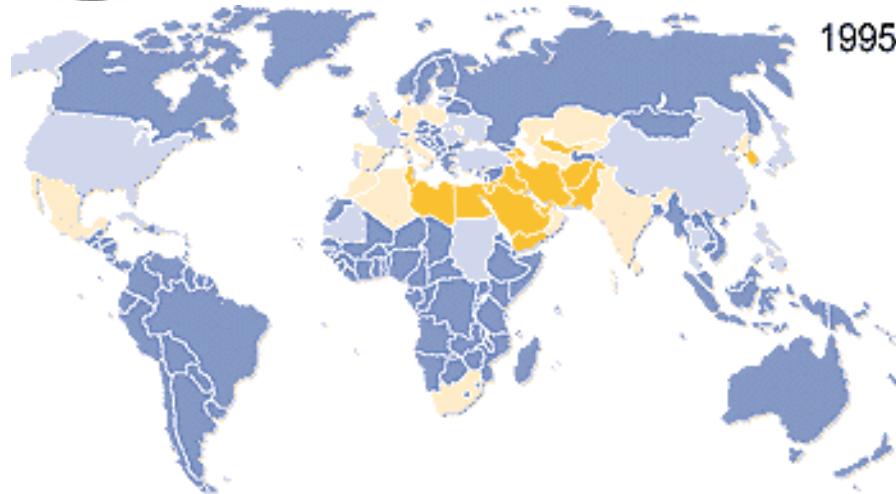
# Water Scarcity



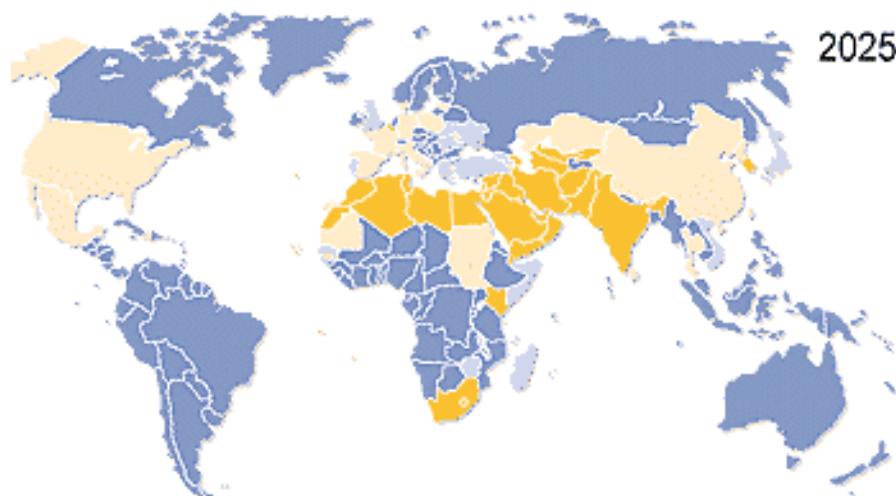
Source: International Water Management Institute 2002



# Water Scarcity



1995



2025

water withdrawal as percentage of total available

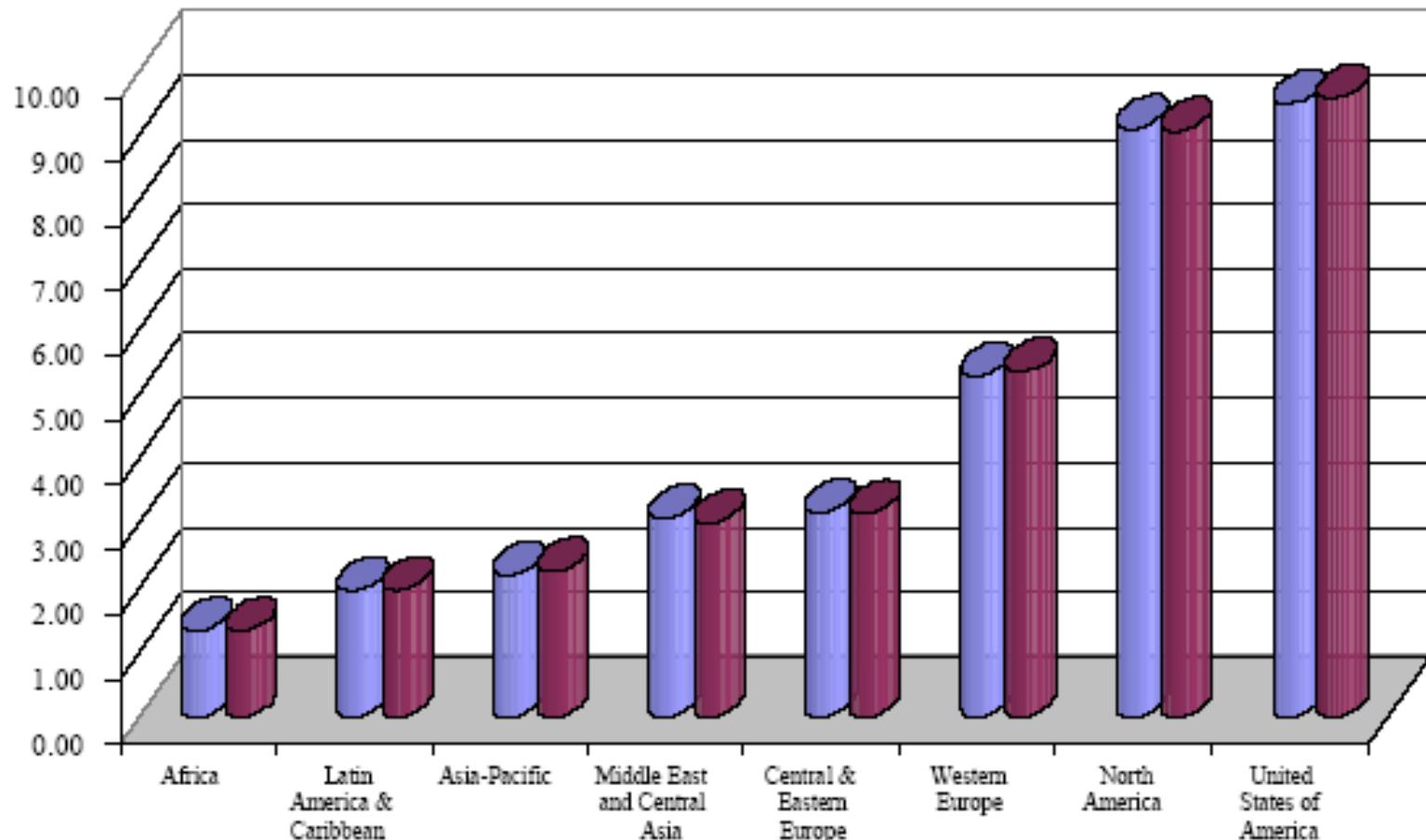
more than 40%	20% to 10%
40% to 20%	less than 10%

The US intelligence community predicts that changes in population and the spread of information and disease will increasingly threaten US national security.

Water scarcity is expected to be a significant contributor to instability around the world.



## PER CAPITA FOOTPRINTS BY REGION 1999-2000

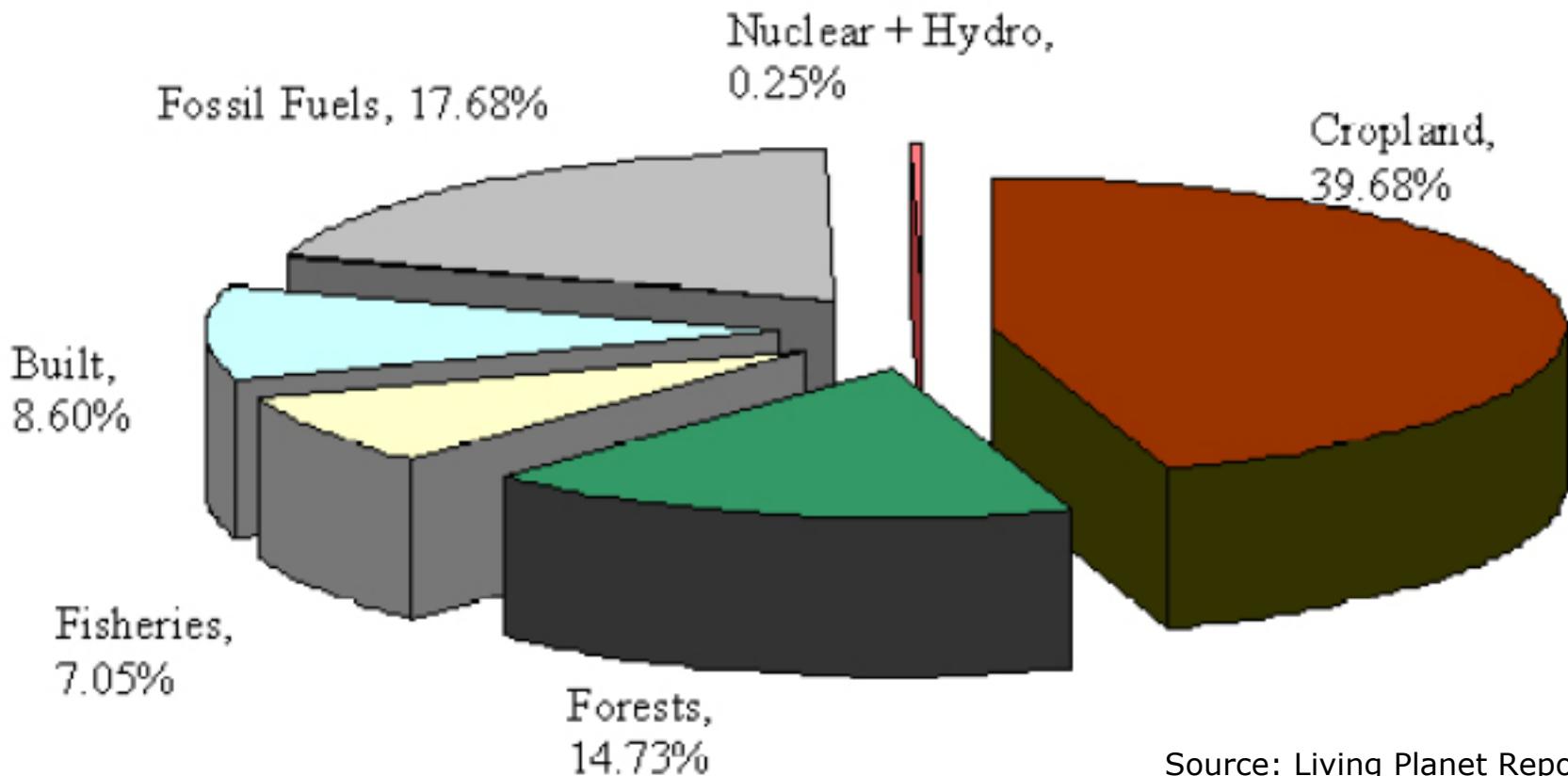


Source: Living Planet Report (2000)



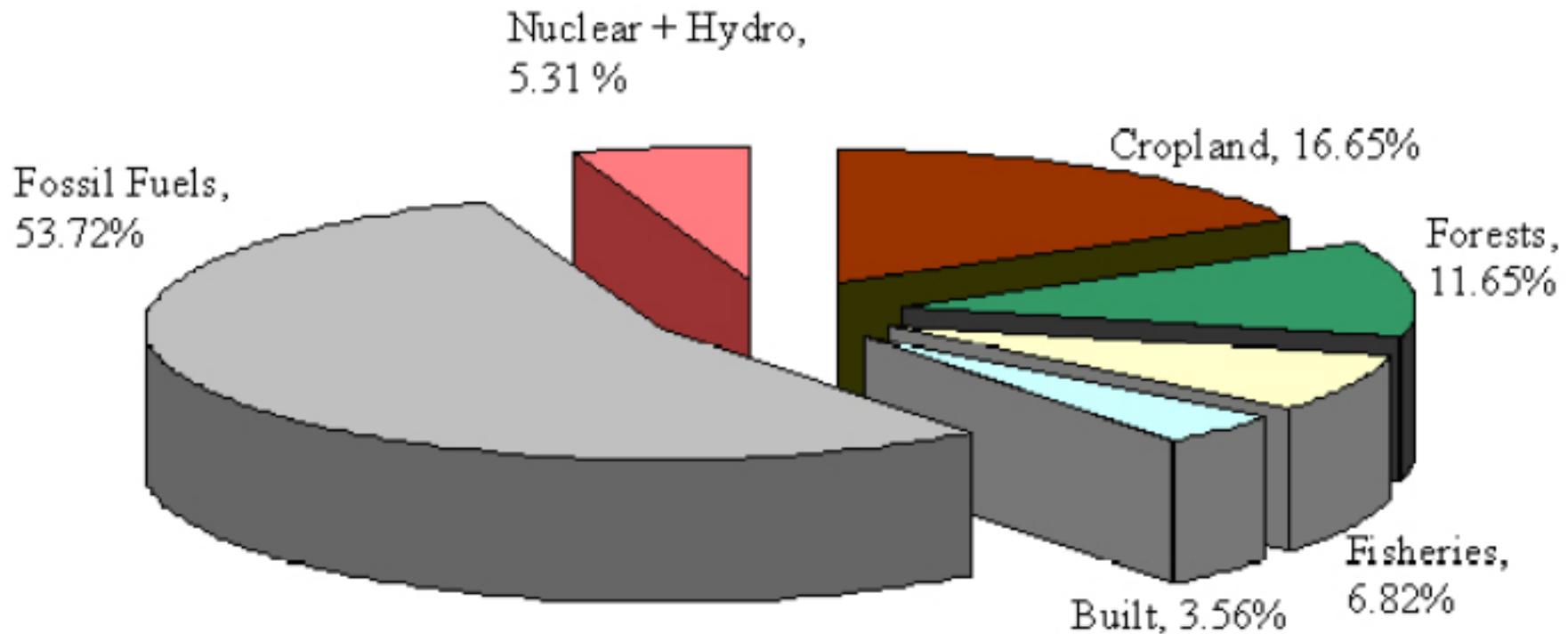
# Sources of Footprints

## Lower Income Countries



# Sources of Footprints

## Higher Income Countries



Source: Living Planet Report (2000)